IRON & COAL
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Vol. 183 No. 4852
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LONDON: FRIDAY, JULY 14, 1961
Registered as a Newspaper

BELMOS NCB STANDARD RANGE

SBU.1. CIRCUIT BREAKER

200 ampere rating
BUXTON-CERTIFIED for Group I gases—Certificate No. 4242
Breaking capacity tested to 8·1 MVA at 550 V 0·25 power factor
Earth leakage protection with intrinsically safe lockout circuit
Intrinsically safe circuit for remote "Emergency Stop" control and electrical interlock

SGU.2 GATE-END BOX

150 ampere rating
BUXTON-CERTIFIED for Group I gases—Certificate No. FLP 3925
On-load isolating switch with tested breaking capacity of 1,200 amperes
"Long range" solenoid type overload relay
Earth leakage protection with intrinsically safe lockout circuit

SDU DRILL CONTROL UNIT

2·5 kVA transformer for supplying one 3 h.p. or two 1½ h.p. drills
BUXTON-CERTIFIED for Group I gases—Certificate No. 4087
On-load isolating switch
Individual reversing switch for each drill
Earth leakage protection with intrinsically safe lockout circuit

SLU LIGHTING TRANSFORMER

4·5 kVA transformer for supplying one 40 ampere or three 13 ampere lighting circuits at 115 volts
BUXTON-CERTIFIED for Group I gases—Certificate No. 4180
Output voltages of 115, 125, 230 and 250 volts—easily selected by changeover links
Individual circuit breakers to protect each secondary circuit

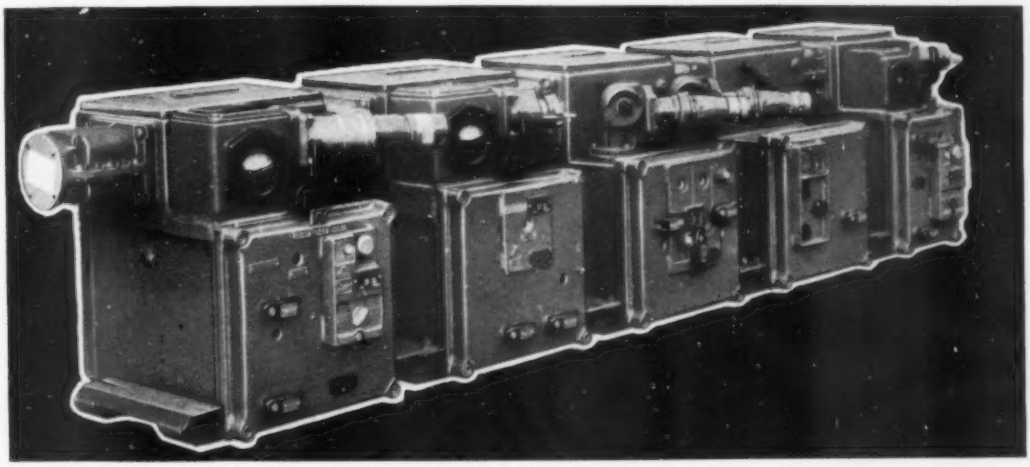
SGU. 30 GATE-END BOX

Up to 25 h.p. at 550 volts
BUXTON-CERTIFIED for Group I gases—Certificate No. FLP 4318
Earth leakage protection with intrinsically safe lockout circuit
Intrinsically safe remote control circuit complying with NCB SPECIFICATION P130/1955
Stalled-current-breaking isolating switch
Remote control and sequence interlocking facilities

Over forty years devoted exclusively to the manufacture of motor control gear have earned for Belmos equipment a name for reliability and trouble free service.

Area offices are established throughout the country staffed by control gear specialists who will be happy to advise on any installation problem.

Belmos
of Bellshill
THE BELMOS COMPANY
BELLSHILL LANARKSHIRE



PAM 404B

LONDON GLASGOW BIRMINGHAM NEWCASTLE MANCHESTER SHEFFIELD CARDIFF

4 STAND TANDEM COLD STRIP MILL

This new Davy-United 10½" and 26" x 22" 4-high 4-stand tandem cold strip mill rolls mild steel and high carbon strip from 4" to 18" wide at speeds up to 2,100 ft. per minute. The mill was installed in the Brinsworth plant of Steel, Peech & Tozer Branch of The United Steel Companies Limited.

Special Davy-United instrumentation on the mill consists of automatic gauge control on stands 1 and 4, loadmeters on all stands and automatic inter-stand tension control between stands 3 and 4.

DAVY-UNITED | DAVY-ASHMORE GROUP

DAVY AND UNITED ENGINEERING COMPANY LIMITED · SHEFFIELD

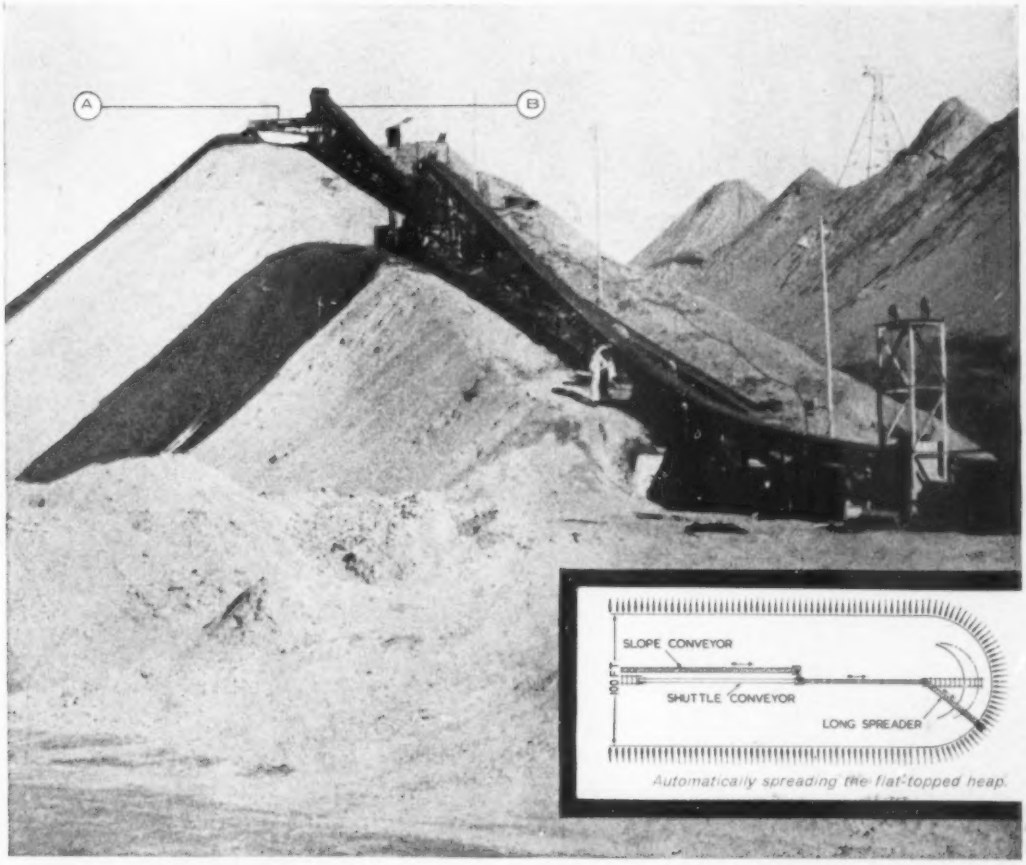
LONDON · STOCKTON · GLASGOW · MIDDLESBROUGH · HULL · PARIS · MONTREAL · MELBOURNE · SYDNEY · JOHANNESBURG · SALISBURY · CALCUTTA · BOMBAY

583

M&C 'GRASSHOPPER' DUMPS WASTE CHEAPLY AND WELL

With short spreader, the M&C 'grasshopper' builds the spoil-heap from the start. On reaching the required height, the long spreader makes a level top, spreading evenly and automatically, advancing a width of 100 ft. A shuttle conveyor inches forward on rails, so that the conveyor feeding it has only to be extended about every 150 ft. Ask M&C for particulars.

Making a new heap. (A) Short spreader. (B) Shuttle conveyor.



Automatically spreading the flat-topped heap.

MAVOR & COULSON LTD

Bridgeton Glasgow S.E. · Olive Grove Road, Sheffield 2
4 Mount Stuart Sq. Cardiff · 1 Eldon Sq. Newcastle-on-Tyne 1

by exclusive agreement...

Newton Chambers

NO. 3 BLAST FURNACE—DOMINION FOUNDRIES & STEEL LTD *Hamilton, Ontario, Canada, designed and installed by John Mohr & Sons. Recent orders include a 28 ft. dia. hearth furnace for United States Steel Corporation at Duquesne Works, to work at 30 lbs. per square inch top pressure.*

NEWTON CHAMBERS

now manufacture and install

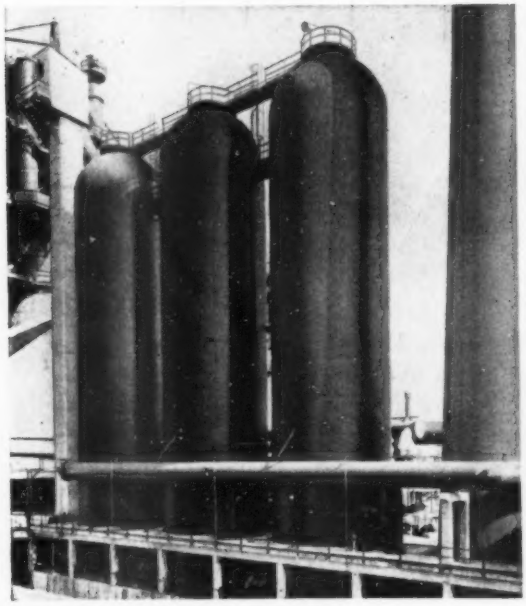
BLAST FURNACES and all ANCILLARY EQUIPMENT

to the designs of JOHN MOHR

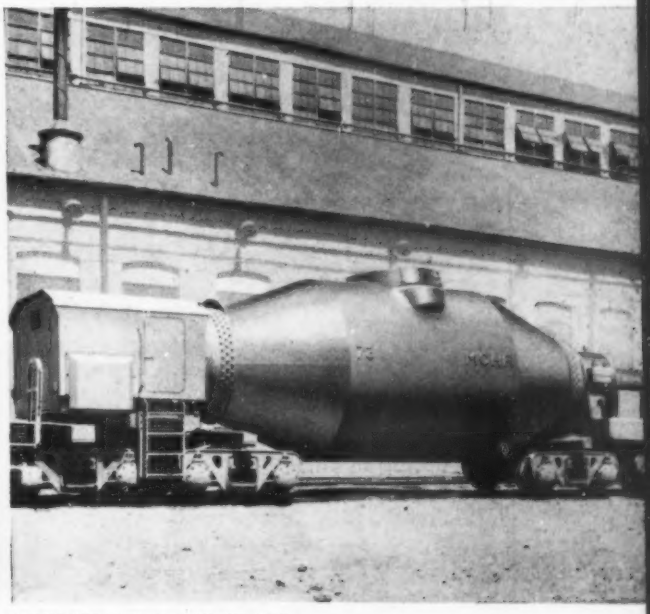
Newton Chambers are pleased to announce that they are now sole manufacturers and suppliers within the United Kingdom and elsewhere of complete blast furnaces to the latest designs of John Mohr & Sons, Chicago, U.S.A. Our traditional experience in this field is combined with that of John Mohr & Sons who have been particularly successful in the development of the modern blast furnace for high top pressure.

Consequently, we are now in a position to undertake complete blast furnace installations of the most up-to-date design, to reconstruct and modernise existing blast furnaces and to offer the whole range of modern blast furnace ancillary equipment.

remember the ever increasing scope of NEWTON CHAMBERS



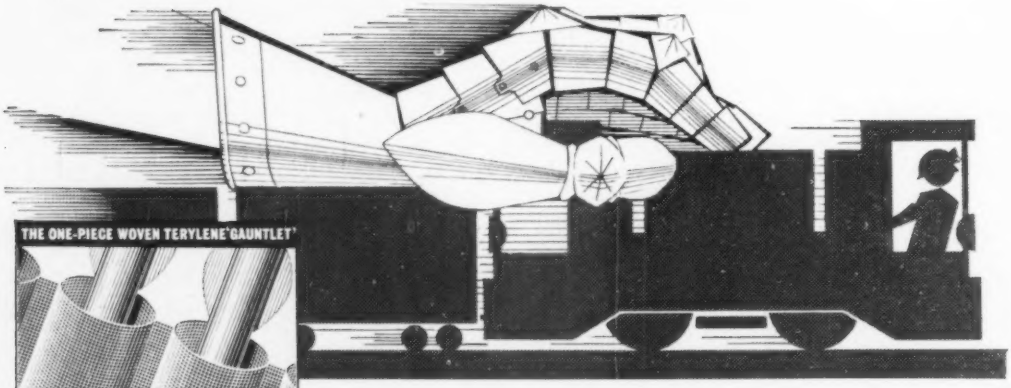
MOHR HOT BLAST STOVES—
135 Stoves installed since 1942. Semi or completely automatic operation as required. Integral Stove Burners now available.



MOHR HOT METAL MIXER CAR.
capacity 200 tons. Range of sizes available to latest designs. Also Pneumatic Tipping Slag Ladles & Cars. Heavy Welded Ladles. Transportation Equipment. Primary Gas Washers, Gas Cleaning Plants.

NEWTON CHAMBERS & COMPANY LIMITED, ENGINEERING DIVISION, THORNCLIFFE, SHEFFIELD

Battery electric mine locos can now work harder and longer between charges



In this patented version of the famous Exide-Ironclad tubular positive plate, a Terylene 'gauntlet' takes the place of slitted ebonite tubes. Terylene possesses physical properties that have made it possible to develop battery compactness, performance and length of life to levels previously out of reach.

'GAUNTLET' plate construction is patented and exclusive to THE NEW Exide-Ironclad BATTERY

The new Exide-Ironclad battery, with its patented 'gauntlet' plate, gives up to 35% more power without increase in battery space. Every battery electric mine loco, as battery replacements become due, can now be equipped to work longer hours or haul heavier loads. The new Exide-Ironclad not only packs more power into the same space, but is livelier in performance and has a greater expectation of life than even Exide-Ironclad could offer till the 'gauntlet' plate was developed.

ML123A

A PRODUCT OF CHLORIDE BATTERIES LIMITED: BACKED BY WORLD-WIDE SERVICE

Enquiries to: London, Elgar 7991; Bristol 664086; West Bromwich 2361; Leeds 20248; Glasgow, Bridgeton 3734; Manchester, Blackfriars 1158; Belfast 27953

CUT CONVEYING COSTS

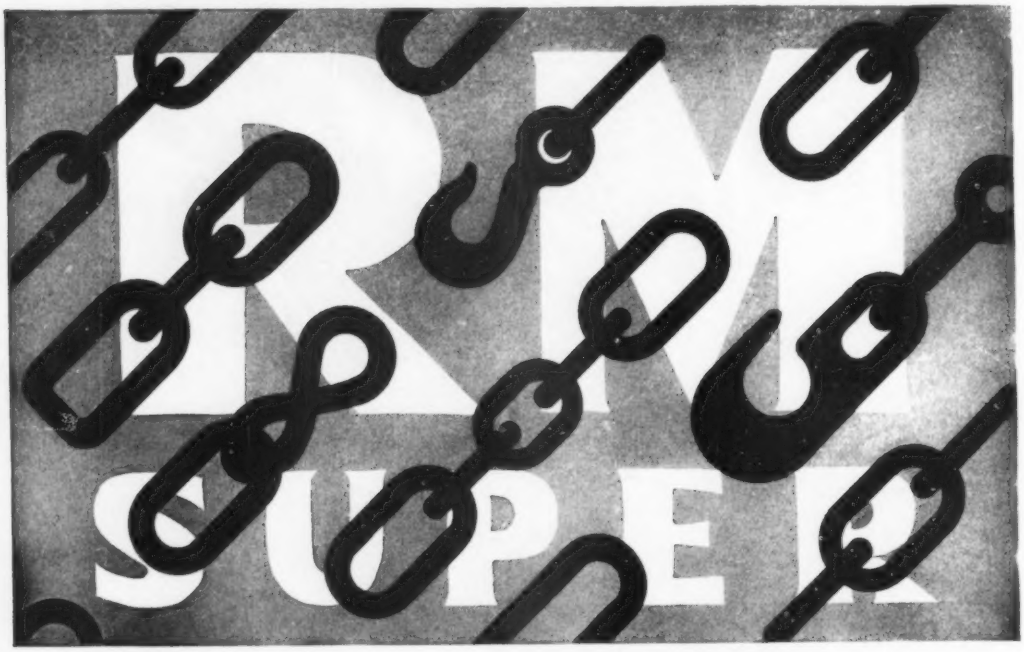
Tough Edges Resist Belt Damage

Inevitable spillage—with resultant jamming of idlers imposing unfair stresses on the belt edge—is a real problem, but one which Silvertown Conveyor Belting keeps to a minimum. Good troughing limits the spillage, whilst correctly compounded and integrally moulded edges present the toughest barrier to belt rip.

Reduce your 'Cost to Produce' by specifying ....

Silvertown
CONVEYOR BELTING

SILVERTOWN RUBBER CO. LTD, HERGA HOUSE, VINCENT SQUARE, LONDON S.W.1
1/3636



1·5% MANGANESE STEEL

COUPLINGS

1 Almost twice as strong as when made in wrought iron.

2 Freedom from embrittlement after heavy overstrain.

3 Welds made by our special process are extremely sound.

4 No periodic heat treatment required to relieve fatigue in material.

5 Owing to the High Impact Value of the steel they are especially suitable for withstanding severe shocks as encountered in mining.

6 Greater resistance to corrosion than wrought iron or mild steel.

7 Do not develop brittleness at sub-zero temperatures like wrought iron or mild steel and not seriously affected even at temperatures as low as—30 deg. C.

Announcement

MARSHALL

have acquired

the sole selling agency for the

LLOYDS LADLE HEATER*

(Patent applied for)

Specially designed and manufactured by

LLOYDS (BURTON) LTD.

for use in the

Drying and Pre-heating of Ladles

THE LLOYDS LADLE HEATER OFFERS THESE ADVANTAGES

1 The heating is rapid and uniform, and kind to the refractories.

2 The heater gives a predictable heating cycle and greater availability of ladles.

3 It requires substantially less fuel.

4 It is easily used and maintained.

Enquiries to :—

THOS. MARSHALL & CO. (LOXLEY) LIMITED

STORRS BRIDGE WORKS, LOXLEY, NR. SHEFFIELD. **Tel. 343844/8**

TAKING THE HUMP OUT—

—with THORNTON lifting gear...

*

SPECIFY
THORNTON
EQUIPMENT—
BUILT TO OUR OWN DESIGN OR CUSTOMER SPECIFICATION

In this 5 stand 14 in. cross country mill, pneumatically operated lifting rollers used in conjunction with inter-stand transfer gear, greatly reduce the manual effort required. The transfer gear enables one man with little effort to move heavy loads between stands. The friction driven lifting rollers bear the weight of these special steel bars of up to 7 ins. square. A single operator can handle heavy white hot loads at increased speeds—with increased safety.

B. THORNTON LTD. TURNBRIDGE, HUDDERSFIELD. *Tel: Huddersfield 7541.*

0-4-0

LIGHT

Weight: 34 tons
Drive: Chain
Horsepower: 230 h.p.

HEAVY

Weight: 40 tons
Drive: Side rods
Horsepower: 310 h.p.

0-6-0

Weight: 48 tons
Drive: Side rods
Horsepower: 310 h.p.

0-8-0

Weight: 74 tons
Drive: Side rods
Horsepower: 620 h.p.

STANDARD GAUGE 4' 8½" ALL OTHER GAUGES WILL BE AVAILABLE IN DUE COURSE

Sentinel
LOCOMOTIVES

Sentinel

0-4-0 Light

STANDARD SPECIFICATION TYPE DL 100

General data

Weight (running order) — 34 tons
Tractive effort (maximum) — 22,000 lb.
Engine — Rolls-Royce Diesel C6SFL
Rating at 1800 r.p.m. — 229 B.H.P. gross
Torque Converter — Rolls-Royce CF 11500 — fitted with twin plate over-centre clutch
Stall Torque ratio — 5.3 : 1
Maximum continuous speed — 16.6 m.p.h.
Reduction and Reverse Gearbox — Ratio 8.47 : 1 — Self-Changing Gears Limited
Final Drive 1.238 : 1 — 2½" pitch, A.S.A. Duplex Roller Chains
Overall reduction — 10.45 : 1
Gauge — 4′ 8½″
Rail clearance (minimum) — 8″
Overall length — 23′ 10½″ or 24′ 4¼″ according to buffer type
Overall width — 8′ 0″
Length over buffer beams — 21′ 3″
Height over cab — 10′ 4″
Wheelbase — 6′ 6″
Wheel arrangement — 0-4-0
Wheel diameter — 38″
Controls — Dual
Axle Boxes — Plain Bearings, White-metalled
Couplings — B.R. Standard
Buffers — Spring Buffers with 24″ diameter heads
Fuel Tank capacity — 203 gallons
Brake Equipment — Laycock-Knorr Straight Air Brake. Engine-mounted Compressor belt-driven 15 cu. ft./min.

0-4-0 Heavy

STANDARD SPECIFICATION TYPE DL 200

General data

Weight (running order) — 40 tons
Tractive effort (maximum) — 25,300 lb
Engine — Rolls-Royce type C8SFL
Rating at 1800 r.p.m. — 311 B.H.P. gross
Torque Converter — Rolls-Royce type CF 11500 Ms 300 fitted with twin-plate over-centre clutch
Stall torque ratio — 5.2 : 1
Maximum continuous speed — 21 m.p.h.
Reduction & Reverse Gearbox — Self-Changing Gears Ltd. Ratio 10.23 : 1
Final drive — Coupling Rods
Overall reduction — 10.23 : 1
Gauge — 4′ 8½″
Rail clearance (minimum) — 8″
Overall length — 24′ 4¾″ ('Wota' Buffers)
Overall width — 8′ 6″
Length over Buffer Beams — 21′ 3″
Height over Cab — 10′ 6″
Wheelbase — 6′ 0″
Wheel arrangement — 0-4-0
Wheel diameter — 42″
Controls — Dual
Axle Boxes — Timken Roller
Couplings — B.R. Standard
Buffers — 'Wota' 24″ diameter
Fuel Tank capacity — 227 gallons
Brake Equipment — Laycock-Knorr Straight Air Brake. Engine-mounted Compressor belt-driven 15 cu. ft./min.

0-6-0

STANDARD SPECIFICATION TYPE DL 300

General data

Weight (running order) — 48 tons
Tractive effort (maximum) — 28,800 lb.
Engine — Rolls-Royce C8SFL Diesel
Rating at 1800 r.p.m. — 311 B.H.P. gross
Torque Converter — Rolls-Royce type CF 11500 Ms 300 fitted with twin-plate over-centre clutch
Stall torque ratio (converter) — 5.2 : 1
Maximum and minimum continuous speeds — 18.4 m.p.h. to 0.9 m.p.h.
Reduction and reverse gearbox — Sentinel/Self-Changing Gears—reduction ratio 11.64 : 1
Final drive — Coupling rods
Overall reduction — 11.64 : 1
Gauge — 4′ 8½″
Rail clearance (minimum) — 8″
Overall length — 27′ 0¼″ ('Wota' Buffers)
Overall width — 8′ 6″
Length over buffer beams — 23′ 10½″
Height over cab — 10′ 6″
Wheelbase — 9′ 8″
Wheel arrangement — 0-6-0
Wheel diameter — 42″
Controls — Dual
Axle Boxes — Timken Roller
Couplings — As required
Buffers — 'Wota' 24″ diameter
Fuel Tank capacity — 227 Imperial gallons
Brake equipment — Sentinel/Laycock-Knorr Straight Air Brake. Engine-mounted 15 cu. ft. per minute belt-driven air compressor.

0-8-0

STANDARD SPECIFICATION TYPE DL 400

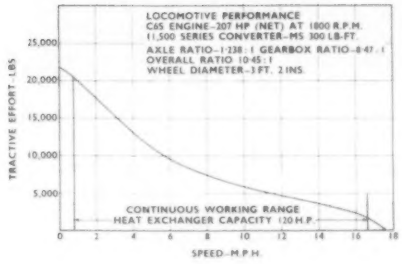
General data

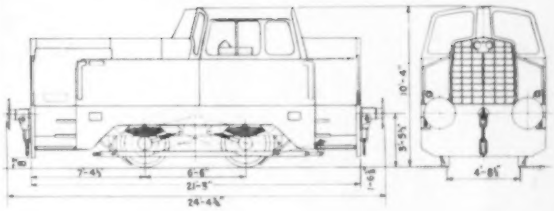
Locomotive performance curve — TCM 10,092 LP 193
Weight (running order) — 74 tons (maximum)
Tractive effort (maximum) — 46,600 lb.
Final drive gearbox ratio — 9.40 : 1
Engines — Two Rolls-Royce type C8SFL
Rating at 1800 r.p.m. — 311 B.H.P. gross (283 B.H.P. nett) each at 1800 r.p.m.
Torque Converters - Two Rolls-Royce type CF11500 Ms 300 fitted with twin-plate over-centre clutch
Stall torque ratio — 5.2 : 1
Maximum continuous speed — 21 m.p.h. at most normal ambient temperatures for British Isles. In exceptional temperatures and with fouled radiator this might be reduced by 1 or 2 m.p.h.
Reduction and reverse gearboxes — 2 Self-Changing Gears Limited Type RF 11—ratio 9.40 : 1
Final Drive — Coupling Rods
Gauge — 4′ 8½″
Rail clearance — 8″
Overall length — 32′ 4¾″ Turton 24″ wide buffers
Overall width — 8′ 6″
Length over buffer beams — 29′ 3″
Height over cab — 11′ 5½″
Wheelbase — 11′ 10½″
Wheel arrangement — 0-8-0
Wheel diameter — 42″
Controls — Dual (pneumatic)
Axle boxes — Timken Roller Bearing
Couplings — B.R. Standard Loose 3 Link
Buffers — Turton 24″ diameter (spring)
Fuel Tank capacity — 500 gallons maximum capacity if required
Brake Equipment — Laycock-Knorr Straight Air brake. Engine-mounted compressors belt-driven 30 cu. ft./min. total.

all Sentinel diesel locomotives are powered by

Locomotives

performance





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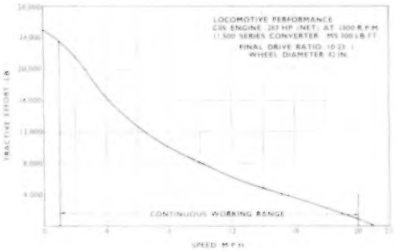

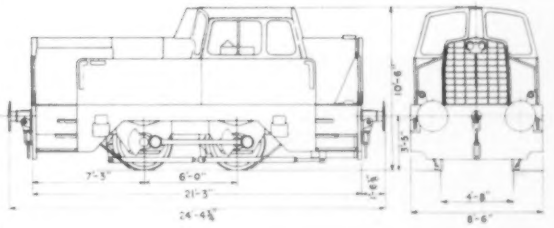

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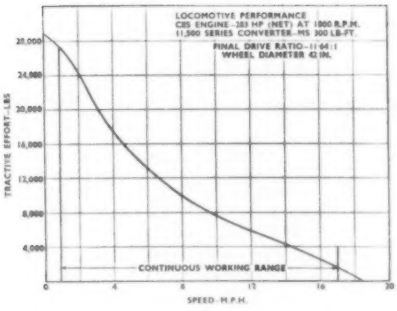

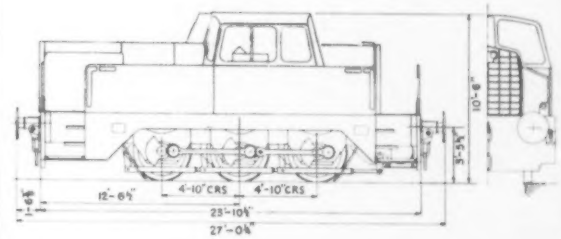

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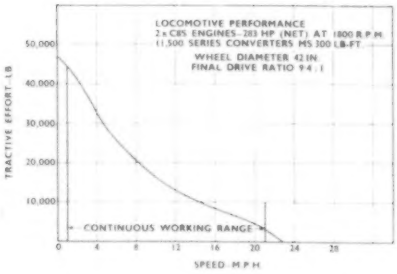
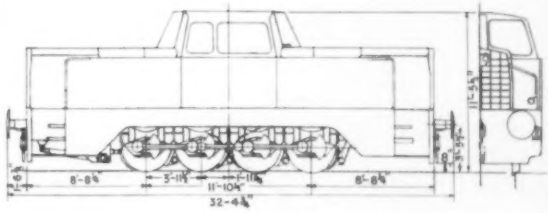




Rolls-Royce engines and torque convertors (TWIN DISC LICENCE)

TRANSMISSIONS, CABS AND CONTROLS ARE STANDARD AND 230 OR 310 HORSEPOWER ENGINES ARE AVAILABLE

DORMAN LONG (STEEL) LTD are at present operating throughout their organisation over

40

Sentinel

LOCOMOTIVES

Sentinel locomotives are operated by

Associated Portland Cement Manufacturers Ltd.
Bass Ratcliffe & Gretton Ltd.
Dorman Long (Steel) Ltd.
Guest Keen & Nettlefolds Ltd.
Imperial Chemical Industries Ltd.
National Smelting Co. Ltd.
Richard Thomas and Baldwins Ltd.
Stavely Iron & Chemical Co. Ltd.
and others

Aerial photograph of Dorman Long (Steel) Ltd., Lackenby Works, where a number of Sentinel locomotives are operating.

Distributed in the British Isles by:
THOMAS HILL (ROTHERHAM) LIMITED, VANGUARD WORKS, KILNHURST, ROTHERHAM TEL: MEXBOROUGH 2571

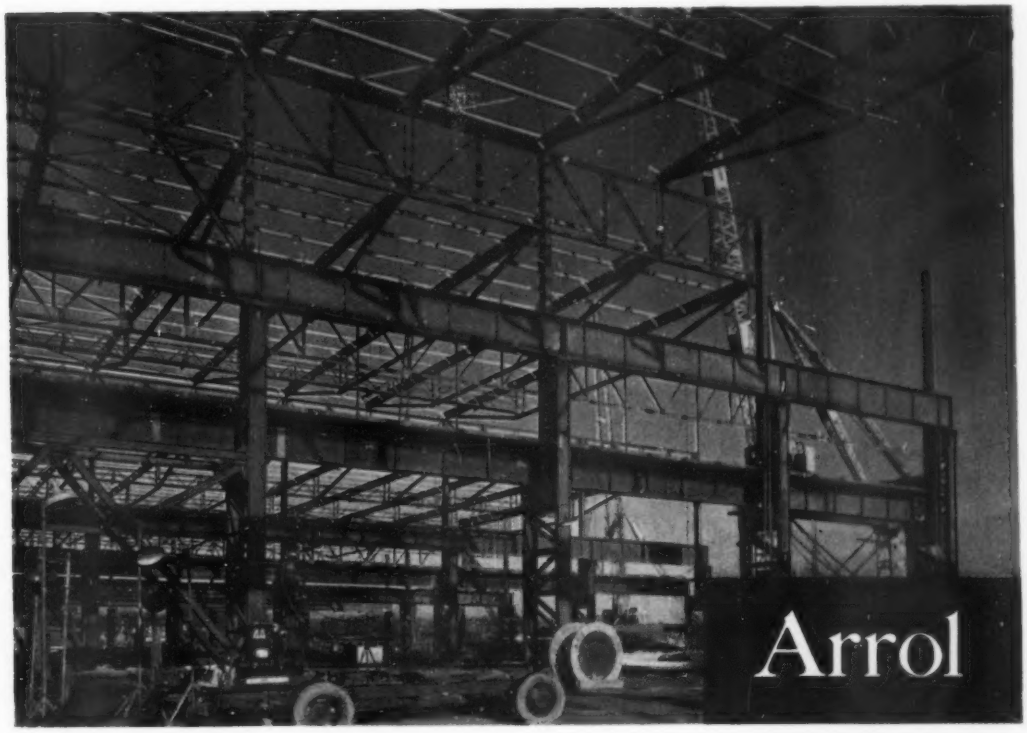
Erection of the new Spencer Works of Richard Thomas & Baldwins Ltd., is progressing satisfactorily and production should begin at the end of this year. Target output will be 1,400,000 tons of steel ingots annually. Arrol of Glasgow are responsible for the supply and erection of the structural steelwork of the cold mill buildings, a commitment that has followed similar work for many other companies in steel and other basic industries.

steelwork for industrial buildings...

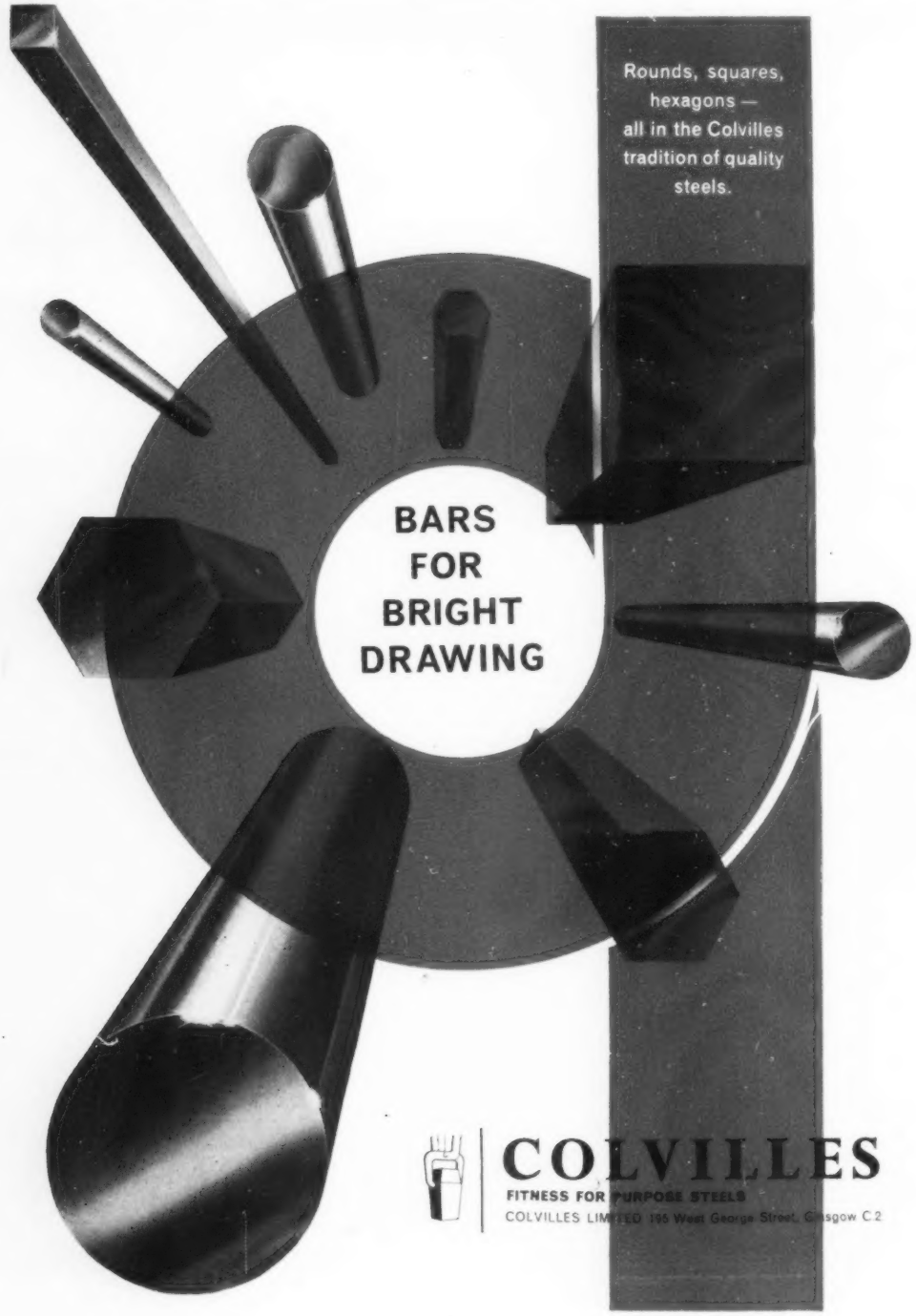
All types of steel framed buildings; fixed and opening bridges; cranes and mechanical engineering work; dock gates; sliding & floating caissons; compressed air locks; hydraulic machinery; pipe lines, surge tanks, sluices and other equipment for hydro-electric projects.

Consulting Engineers, Messrs. W. S. ATKINS & PARTNERS

Cold Mill Buildings at the new Spencer Steelworks, Llanwern, Nr. Newport, Mon., of Richard Thomas & Baldwins, Ltd.



SIR WILLIAM ARROL & COMPANY LIMITED, GLASGOW

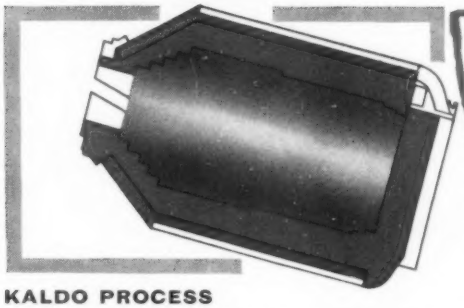

Rounds, squares, hexagons — all in the Colvilles tradition of quality steels.
BARS FOR BRIGHT DRAWING
COLVILLES
FITNESS FOR PURPOSE STEELS
COLVILLES LIMITED 195 West George Street, Glasgow C.2

L.-D. PROCESS

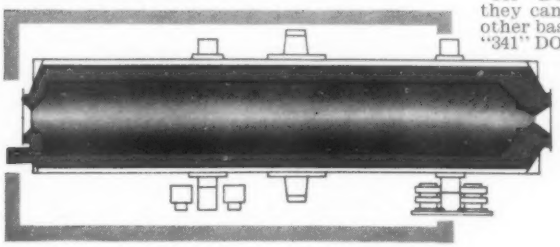
GR '341'

DOLOMITE BRICKS

for OXYGEN & PNEUMATIC STEELMAKING



KALDO PROCESS



ROTOR PROCESS

'341' DOLOMITE BRICKS	
SUPERMAG BRICKS OR FERROCLAD 100 EE	

"341" DOLOMITE bricks are manufactured from a dolomitic limestone which in the natural state approaches in chemical composition the mineral dolomite $CaCO_3$. M_3CO_3. The raw dolomite is dead-burned at high temperatures and it is then formed into suitable shapes by a new and unique brick-making process. Tunnel kiln firing at high temperatures produces a dense, volume stable and truly basic refractory of exceptional quality.

"341" DOLOMITE bricks are resistant to hydration and they can be transported and stocked in the same way as other basic bricks.

"341" DOLOMITE bricks are manufactured in various sizes designed to suit many applications.

"341" DOLOMITE bricks are specially made to withstand the excessive temperatures and turbulent erosive conditions produced in modern pneumatic and oxygen steel processes. "341" Dolomite bricks, being fired to a state of volume stability provide a dolomite lining in its best and most economic form for use in all modern steel converter units.

Please contact our Technical Service Department for further particulars of these and other applications for G.R. "341" bricks.

Typical Chemical Analysis

SiO_2	TiO_2	Fe_2O_3	MnO	Al_2O_3	CaO	MgO
2/3%	0.2%	1/2%	0.1%	1/2%	48/50%	36/40%

Typical Physical Properties

TRUE POROSITY %	18/20
BULK DENSITY grams per c.c.	2.70/2.75
SPECIFIC GRAVITY	3.35
SPECIFIC HEAT	0.25
PERMEABILITY c.g.s. units	0.05
COLD CRUSHING STRENGTH p.s.i.	+8,500
Kilos sq. cm.	+ 600
SPALLING INDEX (small prism test)	Cycles +30
PERMANENT LINEAR CHANGE 2 hrs. at 1,500 C.	Nil to 0.2%
WEIGHT PER CUBIC FOOT	175 lbs.
WEIGHT PER CUBIC METRE	2,700 kilos
WEIGHT PER 1,000 BRICKS 9" x 4½" x 3" approx.	11,700 lbs.
,,	5,300 kilos

THE GENEFAX GROUP for Everything in Refractories

GENERAL REFRACTORIES LTD

GENEFAX HOUSE • SHEFFIELD 10 • Telephone: SHEFFIELD 31113

443

En SPECIFICATIONS

En. No.	Type of Steel	Treatment	Composition (maxima) C. %	Si. %	Mn. %	Ni. %	Cr. %	Mo. %	Ot
8	"40"								
8A	„ Suppl com tion								
8B	„								
8C	„								
8D			·40/ ·35	·05/ ·35	·70/ ·90	–	–	–	
8E			·35/ ·40	·05/ ·35	·90/ 1·1	–	–	–	
8K	"40" carbon	Normalized	·35/ ·45	·05/ ·35	1·[illegible]	–	–	–	
		Hardened and tempered							
8M	"40" carbon (free	Normalized	·35/ ·45	·25	·90/ 1·3			–	
		Cold drav							
		tempered							
8AM	"40" carbon (free-cutting)	–	·33/	·25	·90/ 1·3			–	
8BM	„ „	–		·25	1·				
8CM	„ „	–	8/ ·43	·25	·9 1·3				
8DM			·20/ ·45	·25	·90/ 1·3	–	–	–	

by FORGING—strength

Every Forster forging is subjected to constant physical checks including microscopic and ultrasonic examination where required. "40" carbon steel is accurately tested for strength and structure to the steel against its specification and is made to the exacting requirements of all the principal Classification Societies.

These ingot steel PROPELLER BRACKETS with the arms electrically welded to the bosses were fabricated in mild steel 28/32 tons grade.

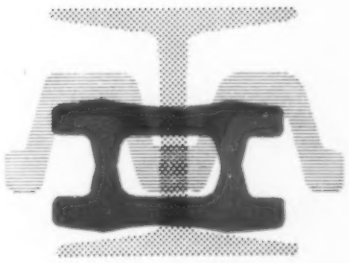
by FORSTER, Craftsman made forgings

T. S. FORSTER & SONS LTD., COPPERAS BANK FORGE, SUNDERLAND.

the GROETSCHEL K. 45 Roof Bar

This Bar in an entirely new section, is made of the same special alloy steel as other Groetschel roof bars. It can be used for face or roadway support. It is ideally suited for slide bar and stagger bar systems. It's advantages include great strength for a comparatively shallow section and suitability for thin seam work.

These bars can be supplied with fixed prop locations and in sections up to 15 ft. long. The Groetschel K. 45 Section is twice as strong as W. Section in vertical bending for comparable weight.



Patents Applied for.

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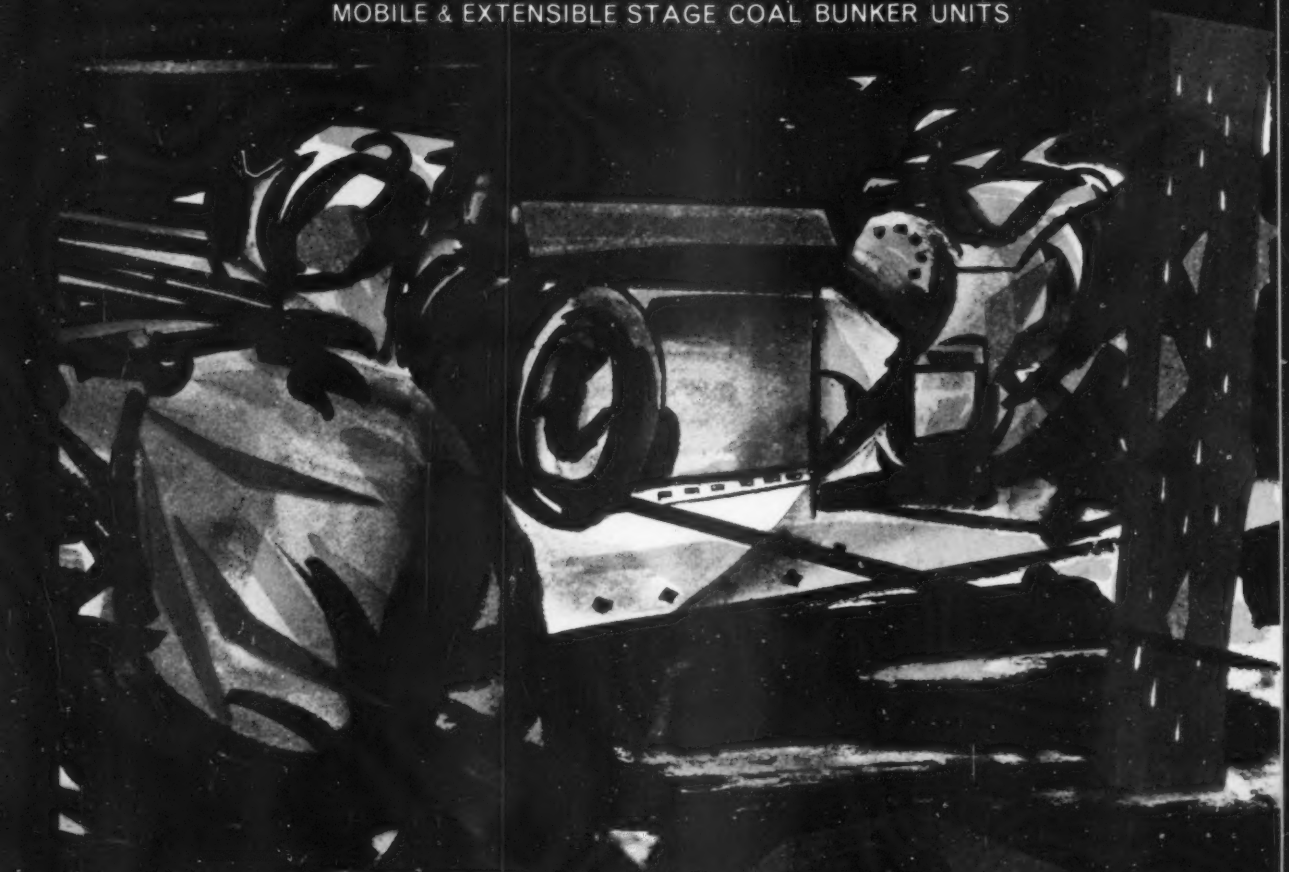
CRAWLEY

MINING EQUIPMENT

Crawley thin seam mining equipment includes:—

CRAWLEY-WILCOX CONTINUOUS MINERS · MOBILE BUNKER CONVEYORS
CRAWLEY MIDGET MINERS · MOBILE STAGE LOADERS
LO-HITE ARMOURED SNAKING CONVEYORS · MOBILE STAGE FEEDERS
HEAVY DUTY SNAKING CONVEYORS · EXTENSIBLE STAGE LOADERS
STATIONARY BUNKER CONVEYORS · EXTENSIBLE TUB LOADERS
MOBILE & EXTENSIBLE STAGE COAL BUNKER UNITS



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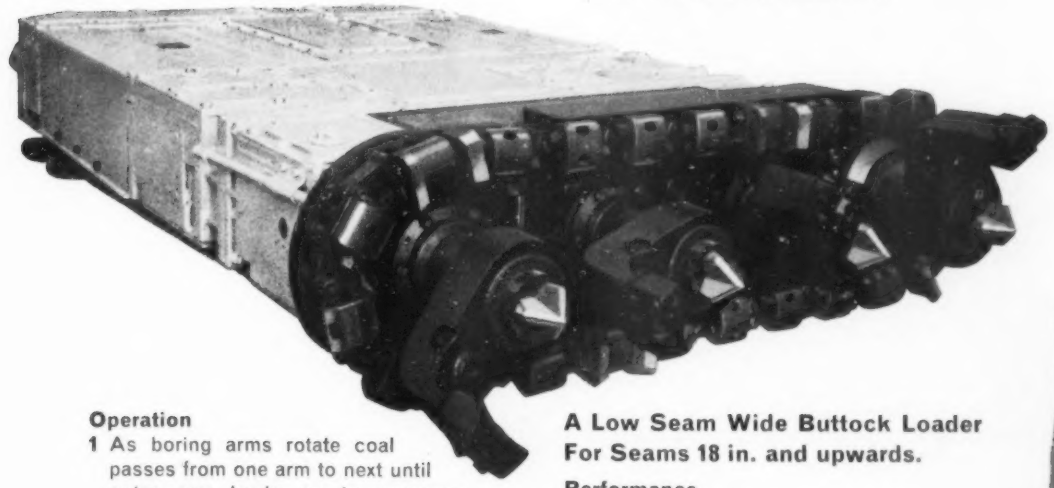
THE CRAWLEY MIDGET MINER



Operation

1 As boring arms rotate coal passes from one arm to next until outer arm loads on to conveyor.
2 Peripheral side cutting chain clears the coal not loaded by trepanning arms and completes loading.

Semi-Automatic Control

Can be fitted with sensing device consisting of gamma ray source which automatically adjusts vertical height of machine depending upon the relative thickness of coal and rock between the source and the receiver due to preferential scattering by rock as compared with coal.

Appreciation

1 The first practical thin seam miner.
2 The first thin seam miner under semi-automatic control.

A Low Seam Wide Buttock Loader For Seams 18 in. and upwards.

Performance

1 Seams 18 in. to 30 in.
2 Depth of cut 4ft. 6in. to 4ft. 9in.
3 200 tons per shift in 2ft. 6in. seam actually achieved.

Specifications

1 Single-ended longwall cutting machine with four boring arms phased at an angle of 72° to each other.
2 Boring arms operated ahead of periphery chain clearing uncut and unloaded coal.
3 Chain includes flight picks bored to ensure complete coal loading.
4 Water jet dust suppression system.
5 Cutting height adjusted by fitting jib inserts.

All Crawley Heavy Duty Machines have the following units standard and interchangeable:

DRIVE FRAME • GEAR BOX • GEAR ASSEMBLIES
EXTENSION SECTIONS • STRUCTURE • TAIL UNIT
CHAIN FLIGHTS

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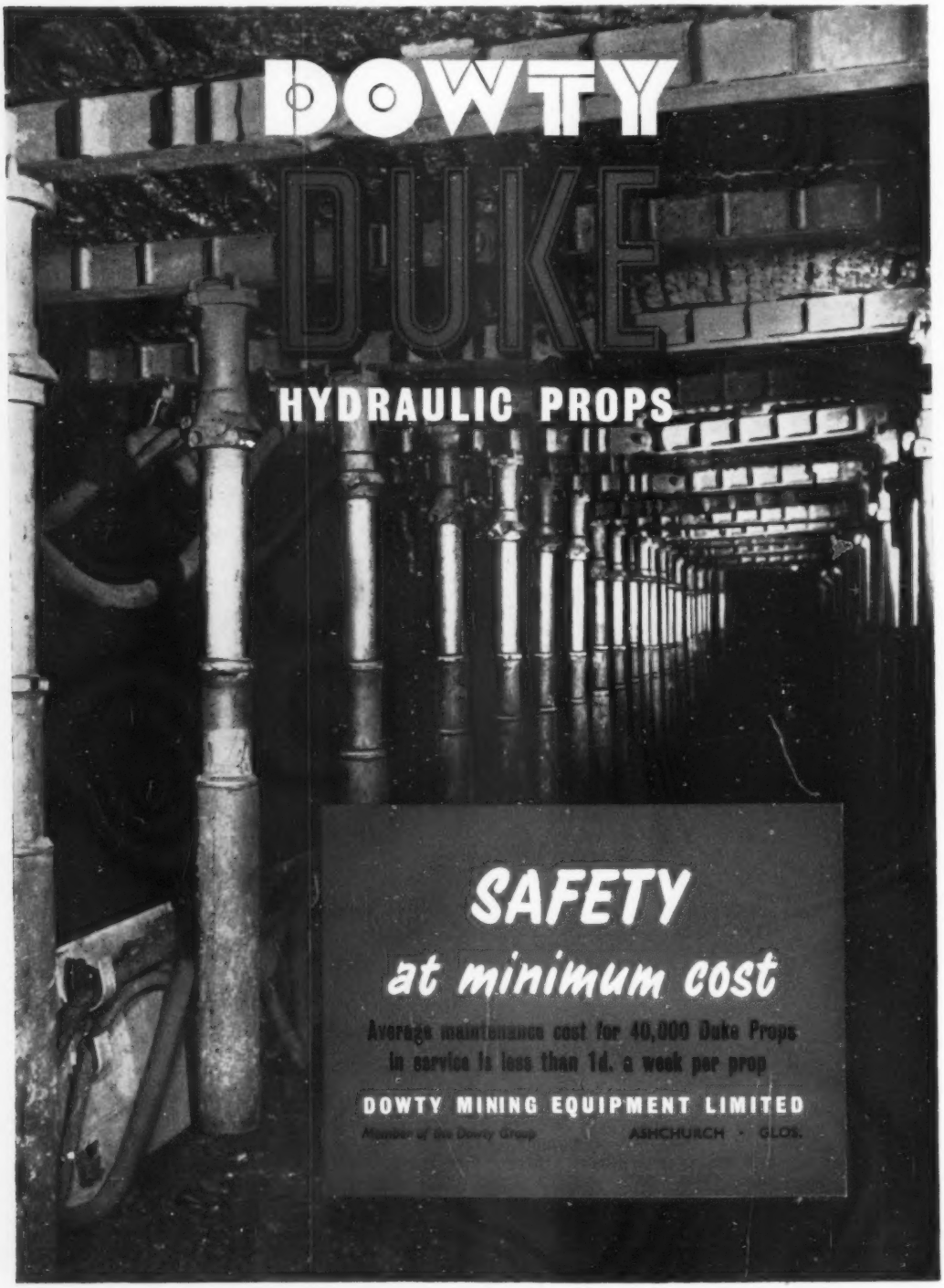
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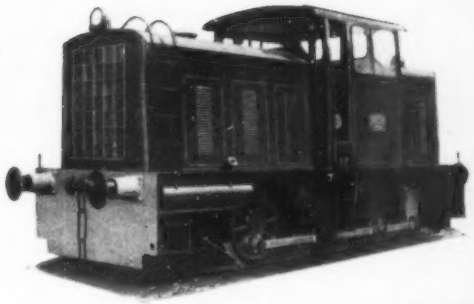
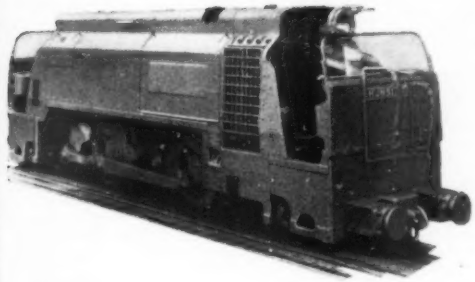
P6089

HUNSLET serves the MINING INDUSTRY

SURFACE SHUNTERS

A well-tried range of standard gauge diesel locomotives is available covering from 150 to 750 h.p. Locomotives in this heavy duty range include units with diesel mechanical and diesel hydraulic transmission. Steam locomotives for all purposes including the famous ' Hunslet ' 18" ' Austerity '.



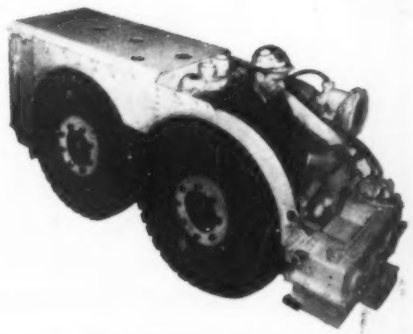


MINES LOCOMOTIVES

The Hunslet flameproof diesel range covers from 23 to 100 h.p. and includes units with single or double-ended driving positions. Electric trolley or battery locomotives with differential drive can also be supplied.

Hunslet have recently introduced two tractors, the MT.25 for underground duties and the ST.125 for surface work. Illustrated is the flameproof MT.25 model which has a hydraulic pump as standard equipment. The basic frame is drilled to receive ancillary equipment, for example:—Angle Dozer, Shovel Loader, Fork Lift, Winch and Trailers, etc.

MINES TRACTORS

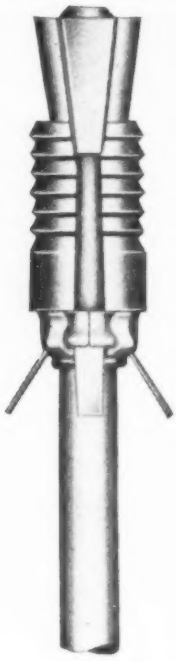


THE HUNSLET ENGINE CO. LTD.
ONE OF THE HUNSLET GROUP OF COMPANIES
HUNSLET ENGINE WORKS, LEEDS 10. LONDON OFFICE: LOCOMOTIVE HOUSE, BUCKINGHAM GATE, LONDON S.W.1.

H89

CUT COSTS

WITH BJB ROOF BOLTS



Much faster to install than less modern types of roof support, BJB Roof Bolts can cut support costs by up to 30%. Forged from high-strength steel (min. breaking strength for ¾" bolt 15 tons) BJB Roof Bolts have an unequalled safety-in-service record. Well over a million are already hard at work supporting the roofs of mines and tunnels all over the country.

Contact our Head Office for the address of your nearest BJB specialist engineer. He'll be glad to advise you on how BJB Roof Bolts can help solve your particular roof support problem.

NOTE: Our engineer will also tell you about the new Bayliss Link Stilt for your arches. Easy to install, it provides a smooth yielding action and can be used over and over again.

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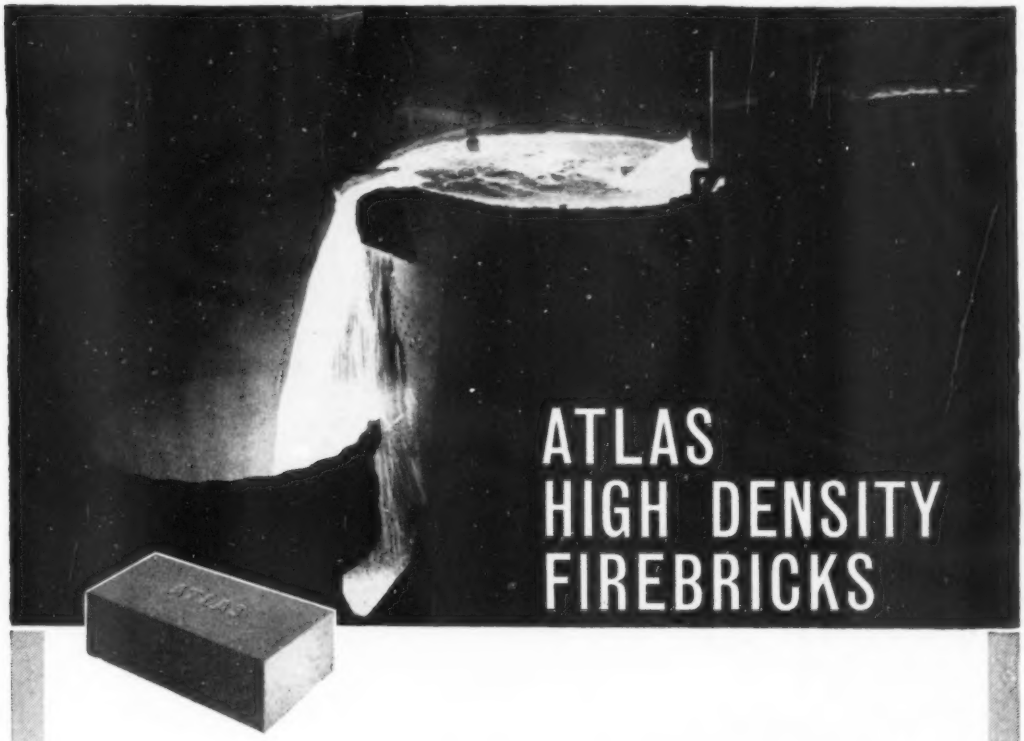

ATLAS HIGH DENSITY FIREBRICKS

No firebrick can withstand high temperatures and heavy loads indefinitely.

But **ATLAS HIGH DENSITY** Firebricks have the maximum life possible under such conditions. They have been produced specifically for ladle linings and are quite unique in their performance in bottoms and the striking areas. High crushing strength and great resistance to penetration, erosion and abrasion have been combined to ensure a long working life.

Use **ATLAS HIGH DENSITY** Firebricks and line less often.

ILLUSTRATION

Tapping a furnace at Abbey Melting Shop, Steel Company of Wales Ltd. Ladle Bottoms are ATLAS Firebricks.

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who have recently placed repeat orders for these reliable locomotives. Brush shunters can be specially built to meet any industrial requirements.

0-4-0 SHUNTERS

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BT12

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Reproduction of the subtleties of steel conditioning as determined in the Laboratory relies as much upon the man as upon modern instrumentation. Experience—most often handed down from father to son—alone can ensure the correct interpretation of the effects of time and temperature established as the result of research. Firth Brown are proud of the wealth of stored experience in the heat-treatment of steel, some of it matured by three generations of service at Atlas Works.

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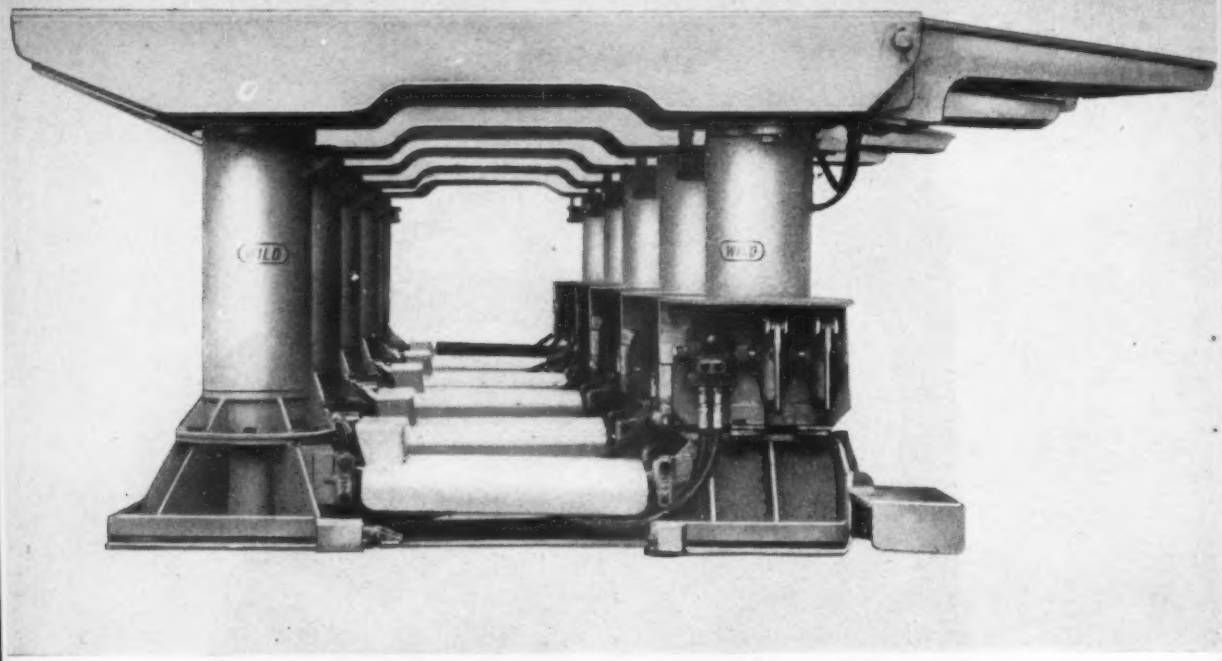
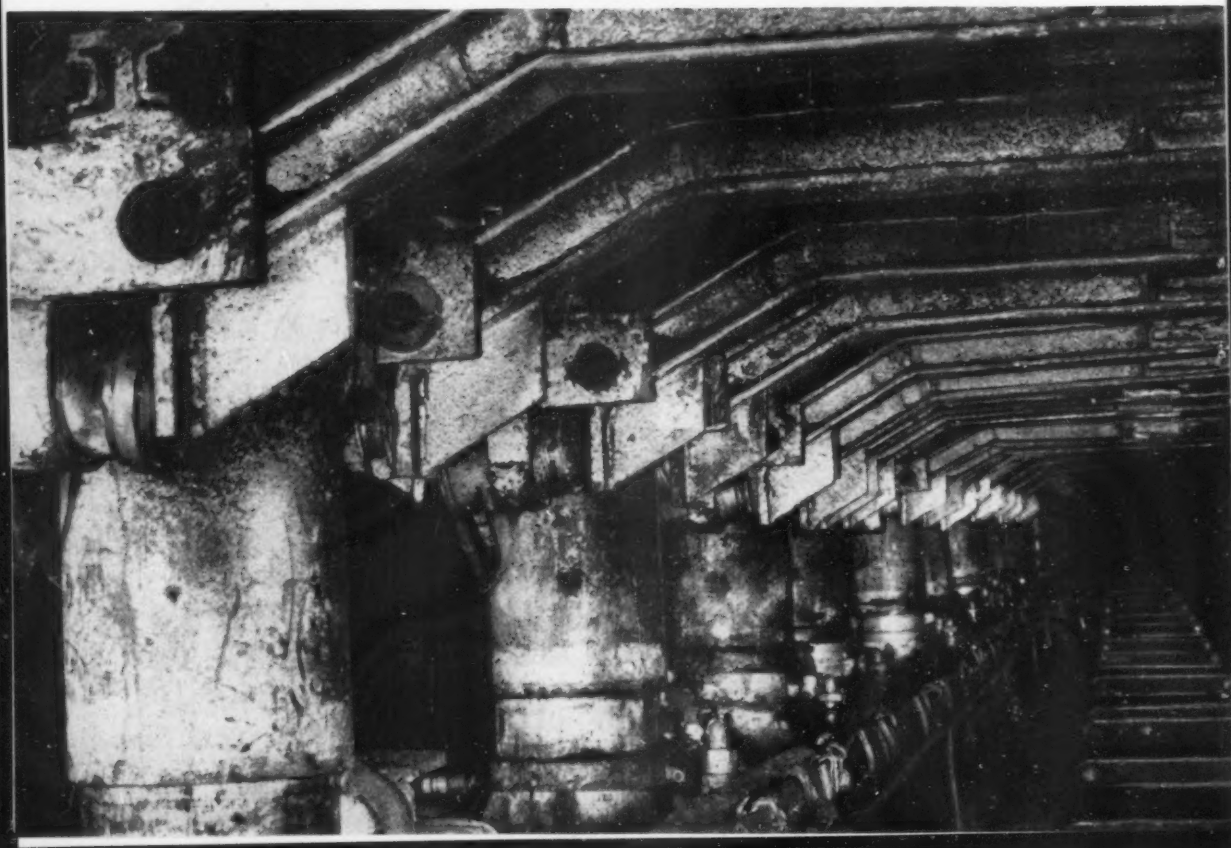


Above:

Goal Post type powered support system, before installation at the face. WILD double-acting rams actuate the units.

Below:

An installation of Gull Wing type powered supports.



SUPPORT SYSTEM

BY WILD

The Desford range of roof support is now widely used in the coal fields. This equipment is designed to withstand the rigorous conditions underground. It operates on water pressure from the high pressure main or pump and is extremely simple to control; yielding is entirely automatic.
Due to simple and robust design maintenance is cut to the minimum and components can be easily exchanged at the coal face in a matter of minutes.

Top: *50 ton thin seam Desford Chock*
Centre: *100 ton Desford Chock with pedestal.*
Bottom: *100 ton Desford Chock with ratchet extension and ram.*

Fully illustrated brochure is available giving full details of the range of Desford Hydraulic Chocks and Powered Supports. SEND NOW FOR YOUR COPY.

These Chocks are covered by N.C.B. and WILD patents.

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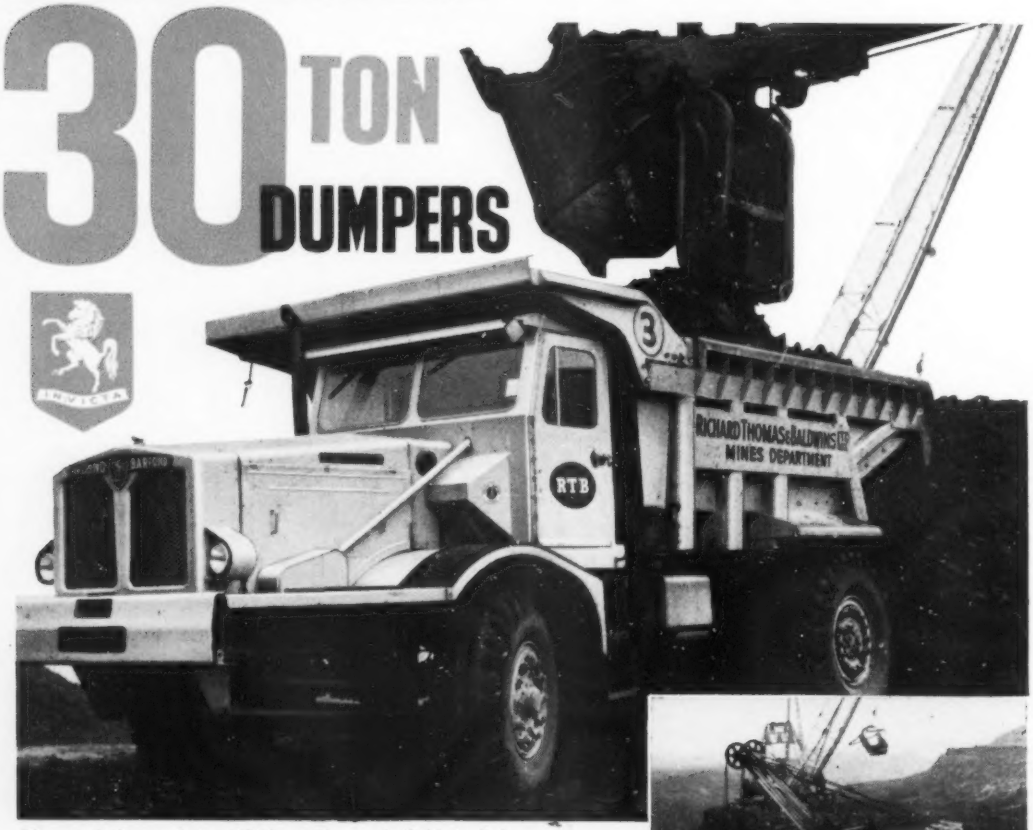

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Unmatched in capacity . . . in speed . . . in power, the mighty Aveling-Barford 'SN' 30-ton dumper is Britain's supreme heavy-duty earthmover.

Features that give the 'SN' complete mastery over the toughest site conditions include:—400 b.h.p. Rolls-Royce turbo-charged diesel engine; optional transmissions:—mechanical—six forward, constant mesh, and one reverse speeds—top 30 m.p.h.; or Allison Torqmatic No. CLBT 5940—four speed ranges with additional automatically selected high ratios in 1st, 2nd, 4th and reverse ranges —top 33 m.p.h.; high tensile steel body; power assisted steering; 9 second hydraulic tip; double reduction rear hubs and air-powered brakes.

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For full particulars of the 'SN' write for publication No. 1852.

Aveling-Barford **SN** 30 TON DUMPER

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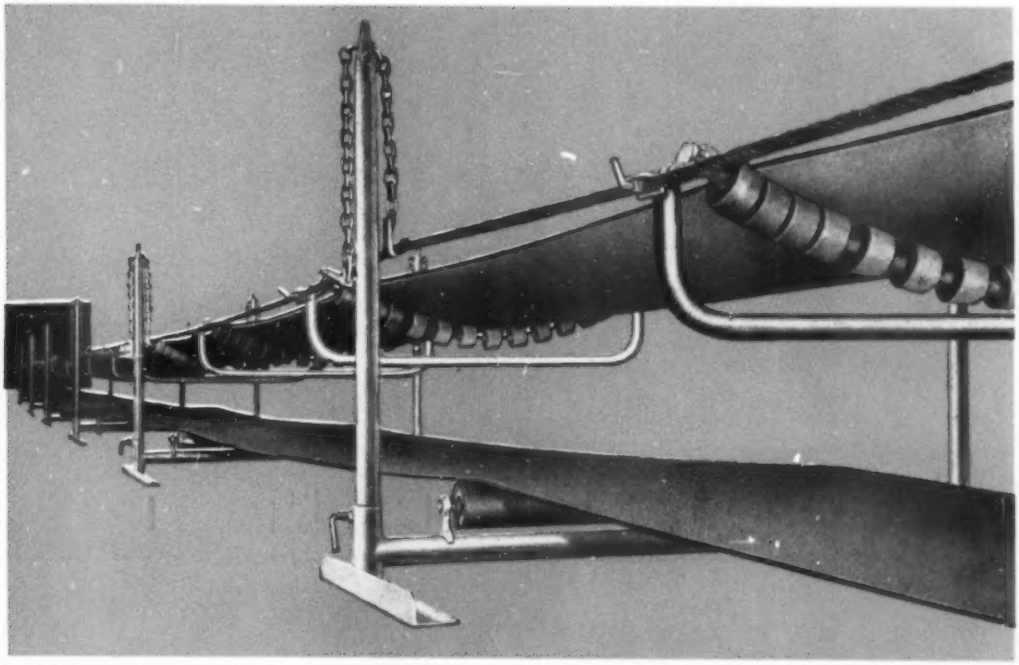

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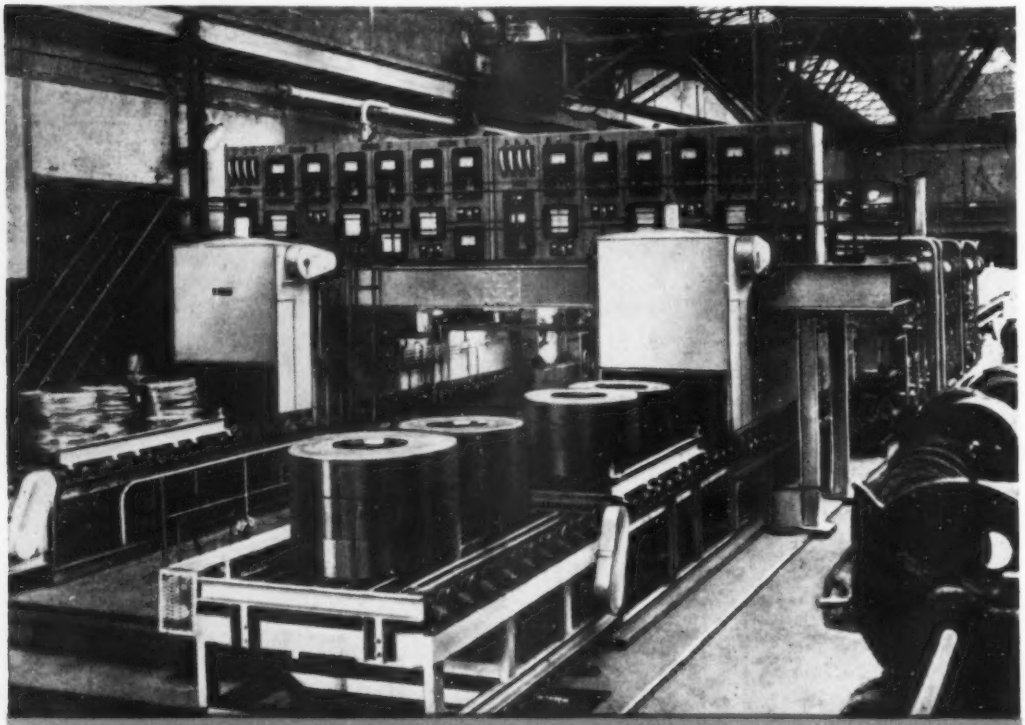

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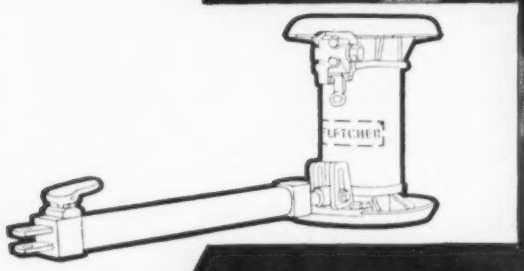
3

FLETCHER DESFORD CHOCKS

in action



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Following successful installations in the East Midlands Division, the Fletcher Desford hydraulic chock has gained a reputation for reliability.

50 and 100 ton versions: 6″ to 18″ stroke at 2″ intervals.

Fully approved by N.C.B —H.15 and H.11.

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double-acting hydraulic ram up to 2′-6″ stroke

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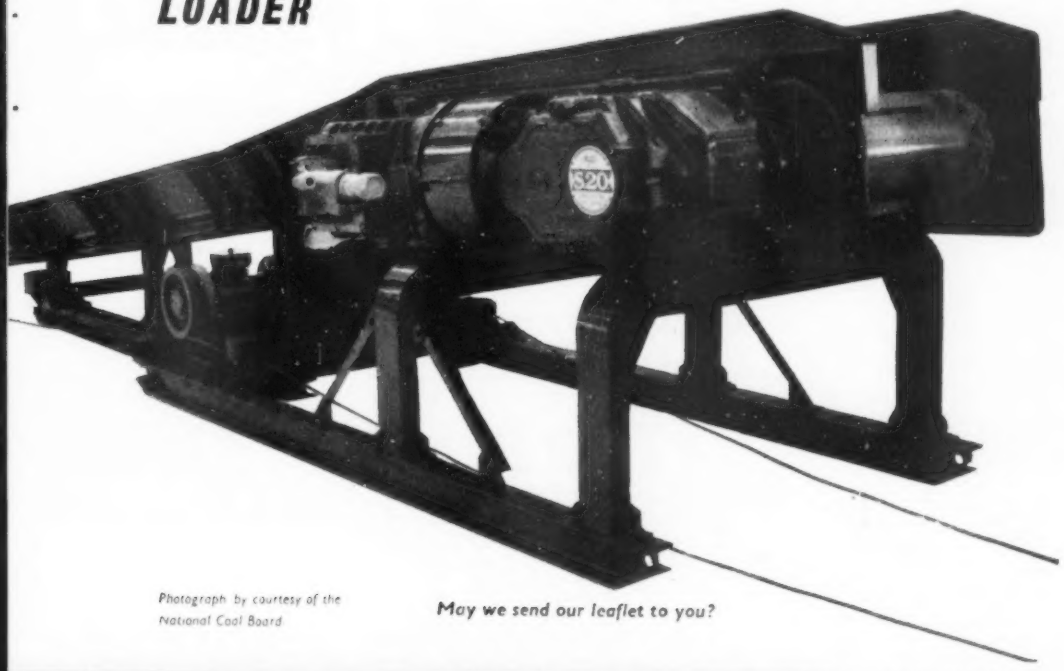

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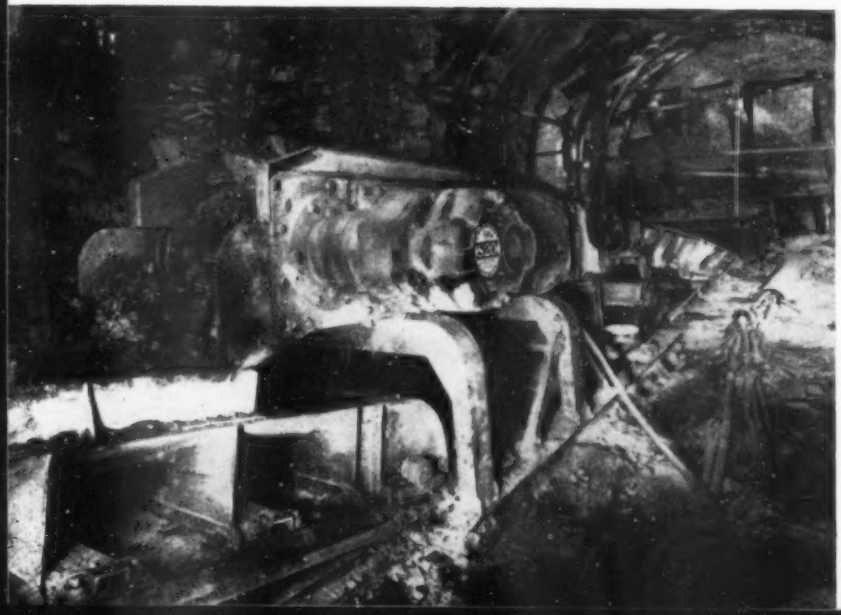

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WORCESTER, ENGLAND.

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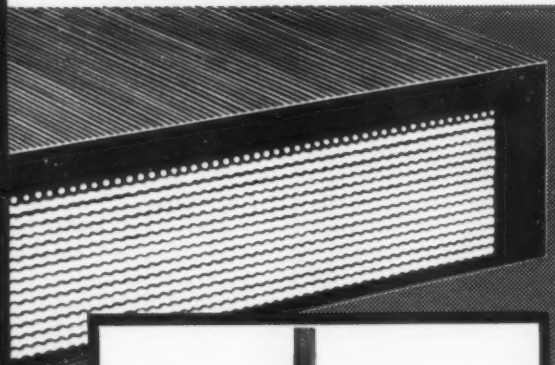

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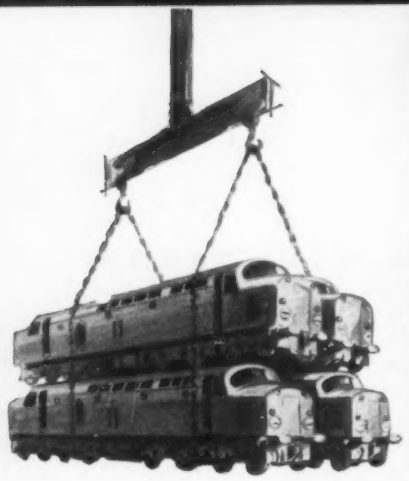

The U.S.S.R. have purchased from Dunlop 6½ miles (500 tons) of some of the strongest conveyor belting in the world! This belting is designed to operate in sub-zero temperatures and will be used for conveying ferrous and non-ferrous ores. Mine and quarry engineers everywhere acclaim the superior efficiency and reliability of Dunlop conveyor belting, and this latest order is further proof of world supremacy in design and manufacture.

This Dunlop belting owes its phenomenal strength to the special Dunlop design of fabric, incorporating man-made fibres, which is totally enclosed in a highly abrasive-resistant rubber compound.

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CONVEYOR BELTING

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MINES FIRE—DUST SUPPRESSION & WATER INFUSION EQUIPMENT

THE LINDLEY "EASY TURN" H.P. STOP VALVE

PROV. PAT. No. 18303/57

Stainless Steel Spindle seat and disc (removable). Easy operation at high pressure. Robust construction throughout. Working pressure 1,500 lb. p.s.i.

THE LINDLEY (Pre-adjustable) H.P. FIRE HYDRANT TYPE 53

PATENT Nos 698,053 AND 781,753

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Working pressure 1,500 lb. p.s.i. Stainless Steel Spindle, seat and disc (removable).

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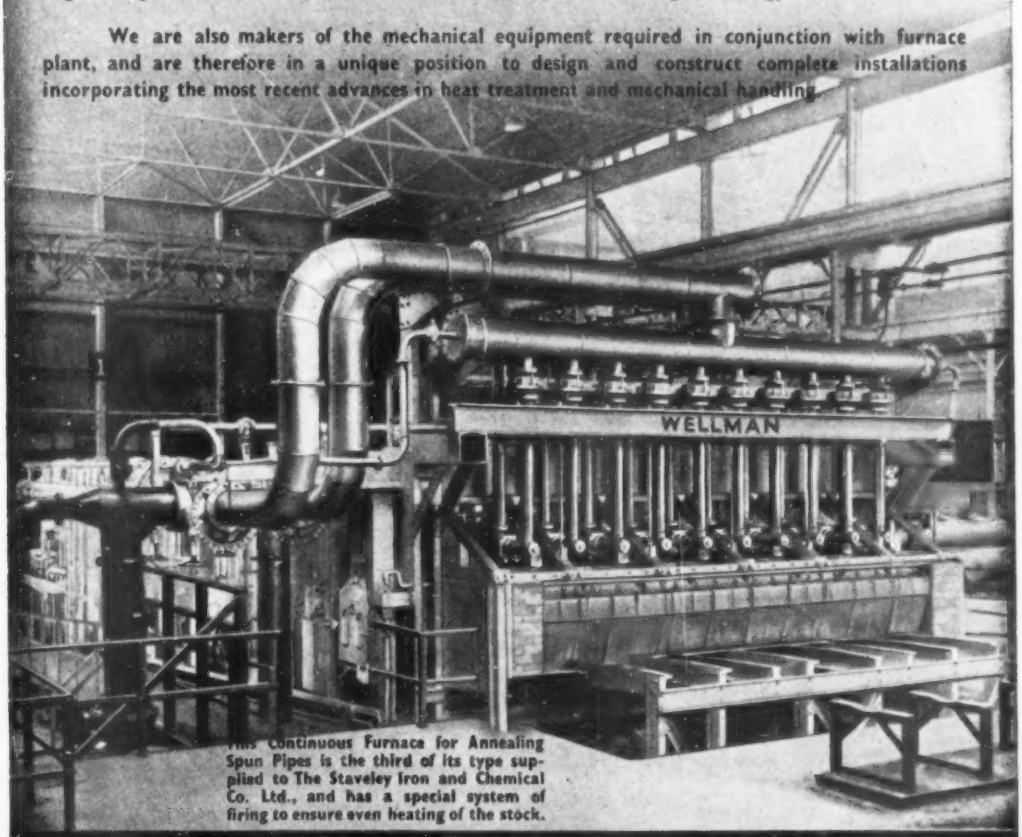

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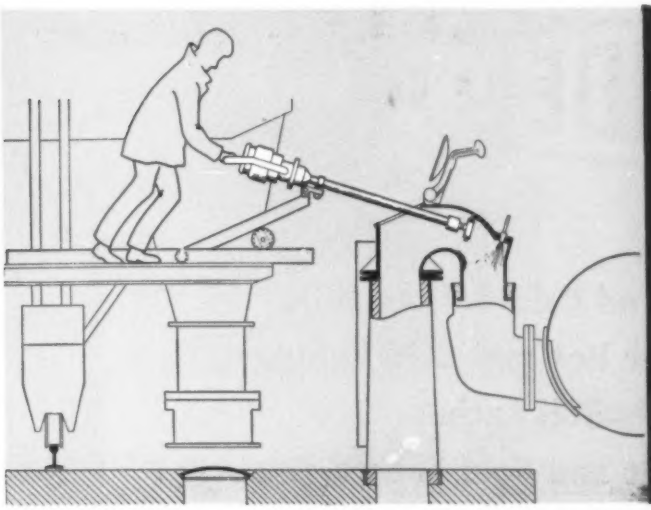

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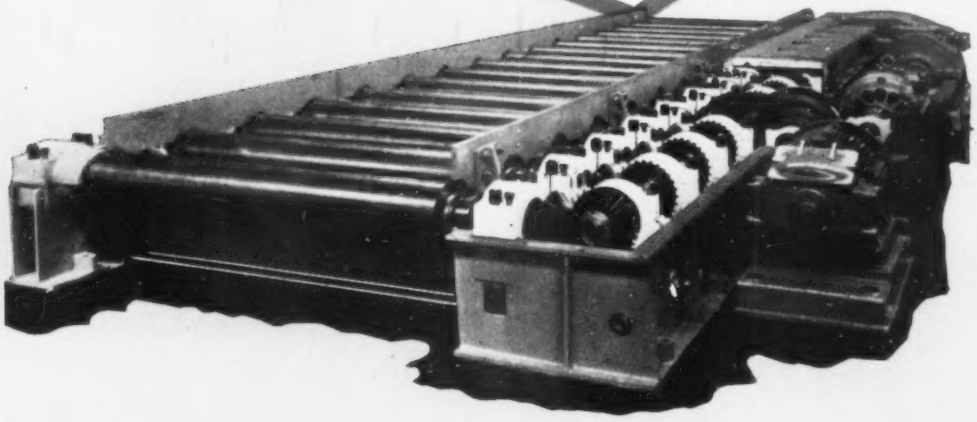

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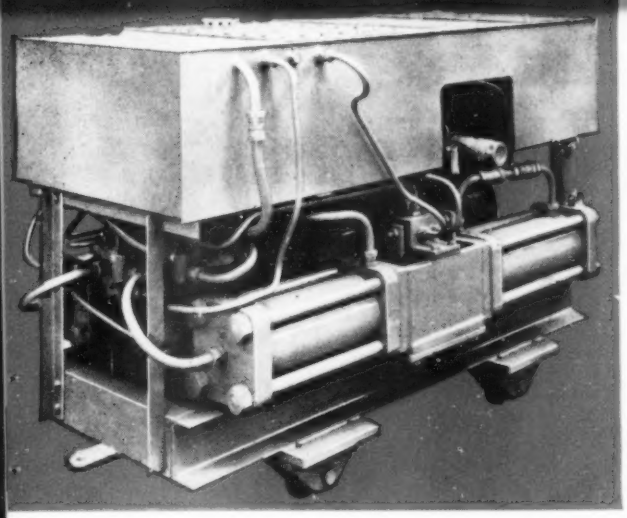

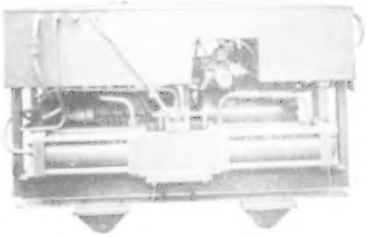

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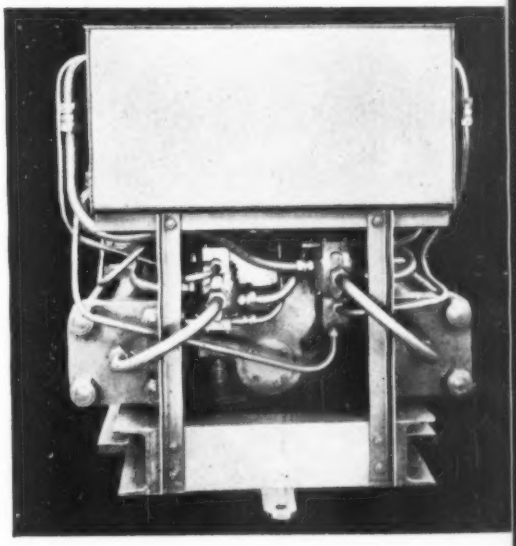

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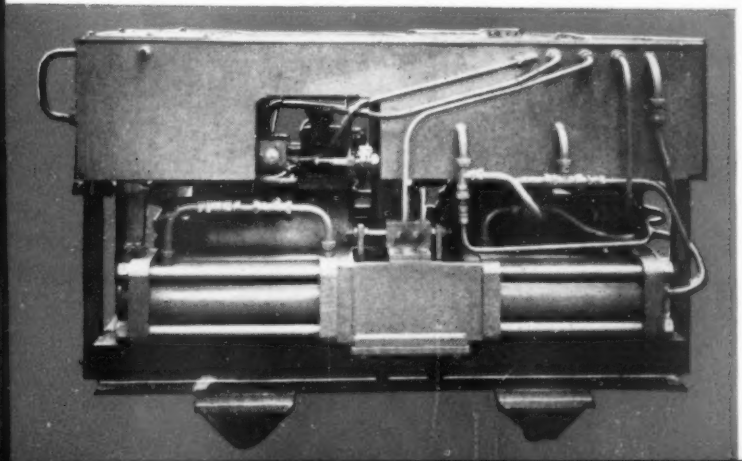

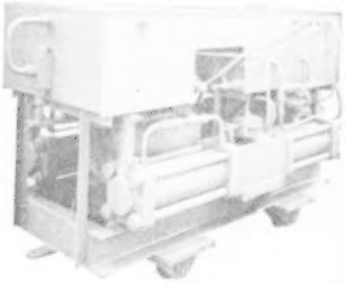

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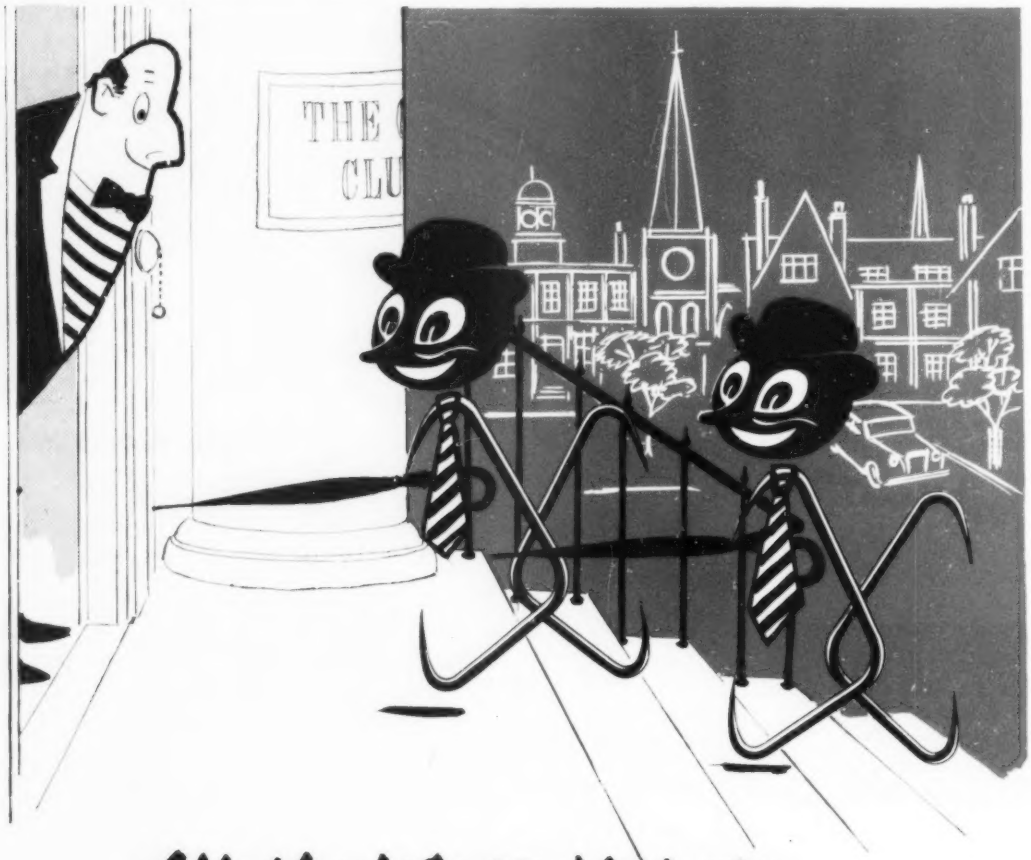

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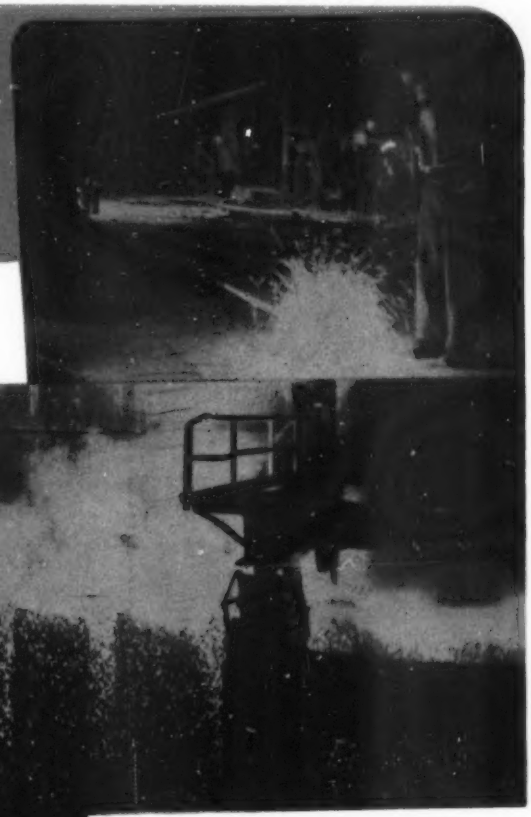

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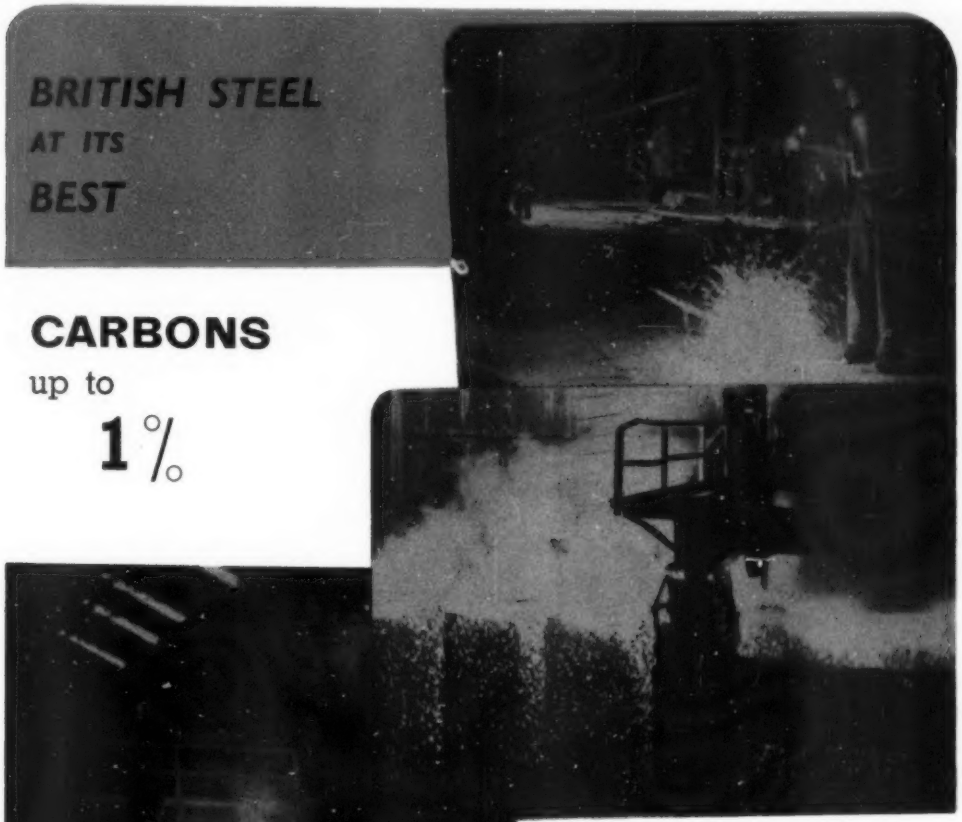

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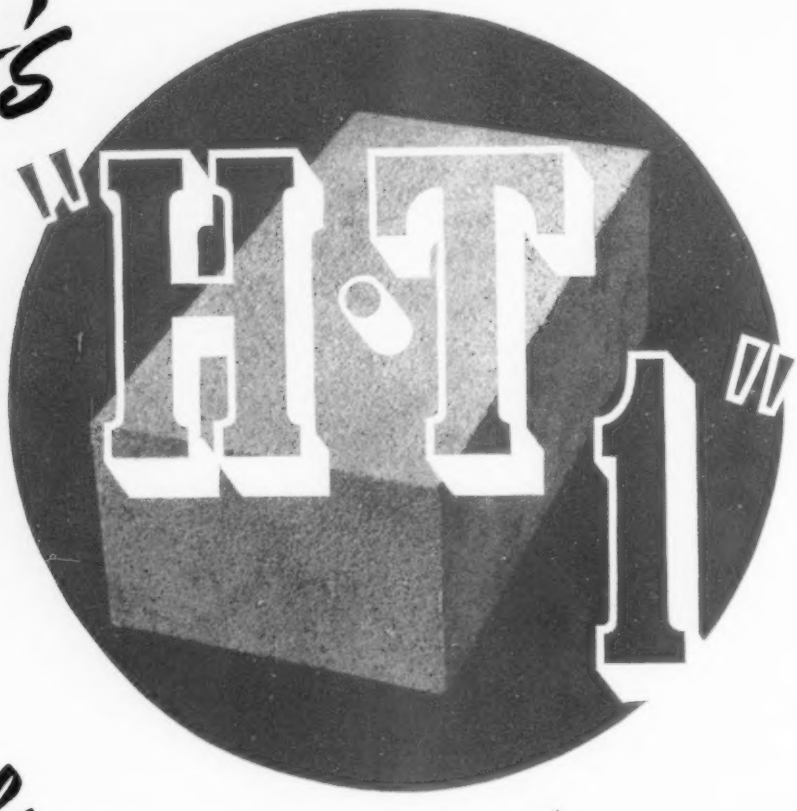

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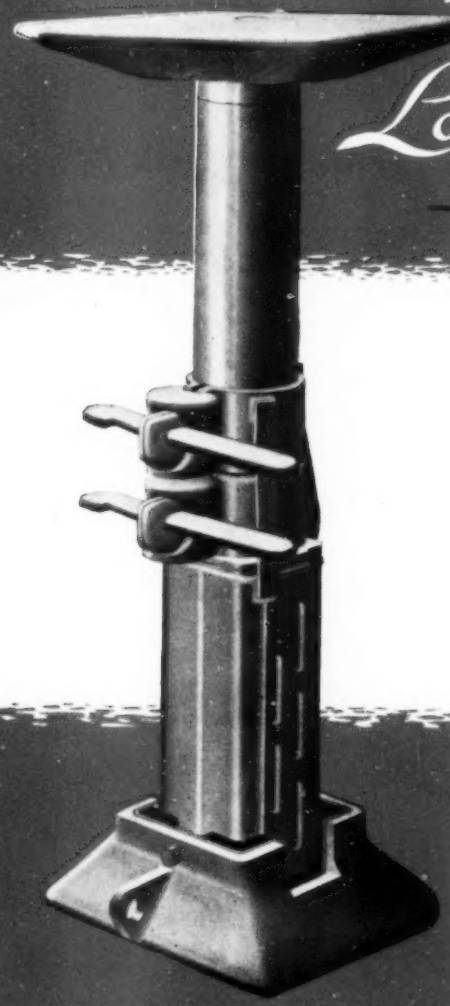

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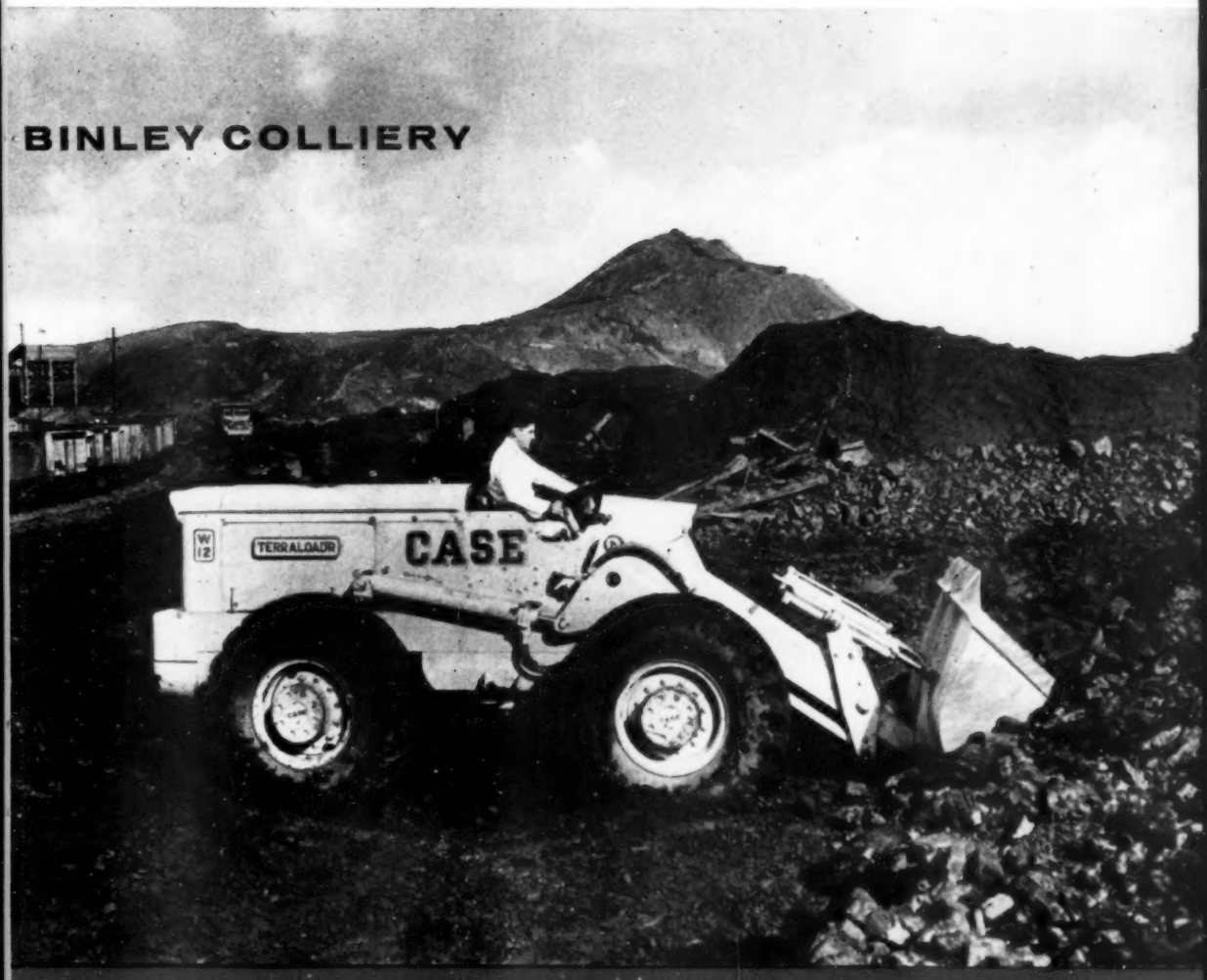

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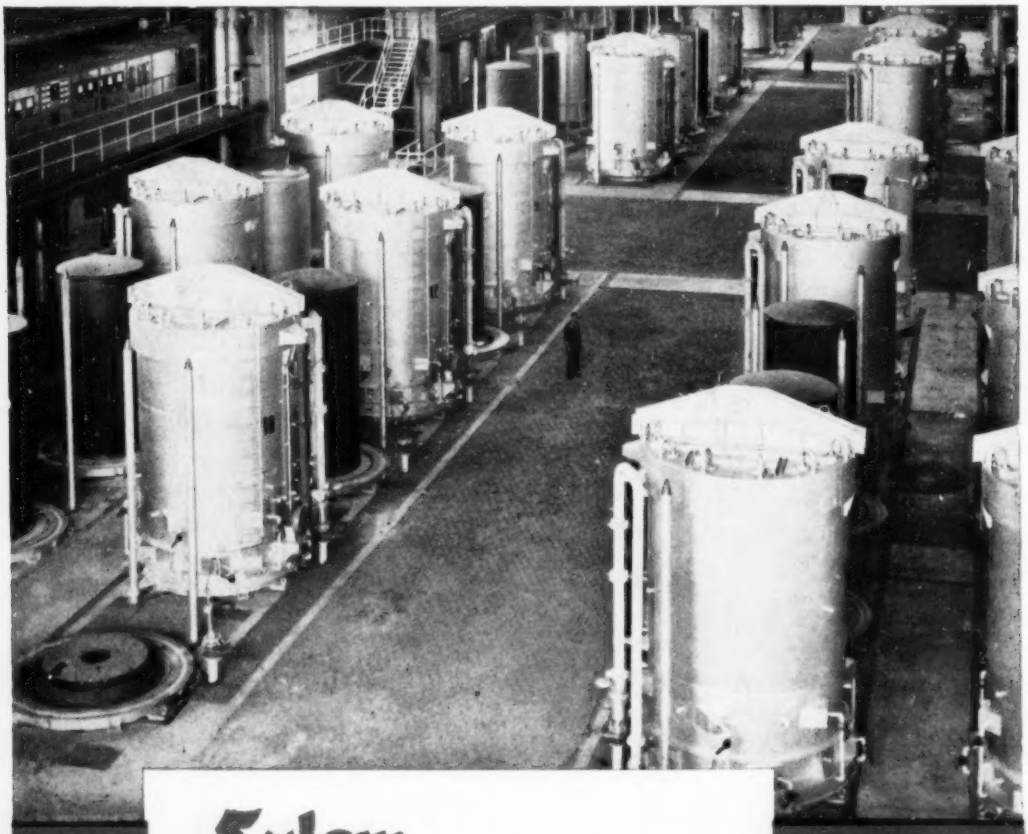

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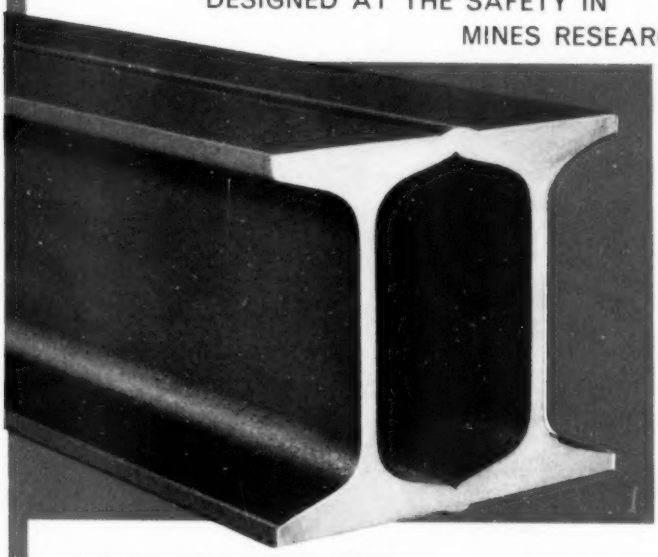

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JULY 14, 1961

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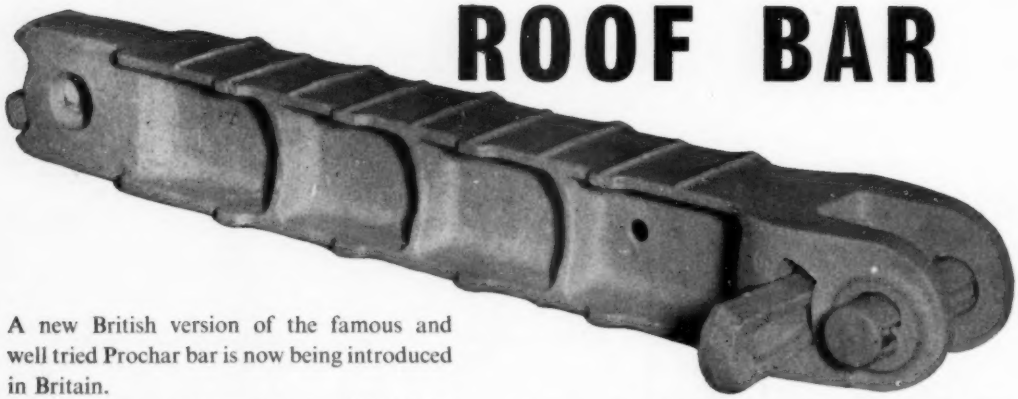
introducing . . **THE NEW PROLLOY ROOF BAR**



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Vol. 183 July 14, 1961 No. 4,852

Common Market Steel

IN his address to the European Parliament at Strasbourg, Mr. Piero Malvestiti, president of the High Authority of the European Coal and Steel Community, was able to report that 1960 was an excellent year for the iron and steel industry. The Community's ingot-steel production reached 72,808,000 metric tons, an advance of nearly 10,000,000 tons on 1959. New records were established in all six countries, and the Community maintained its place in world steel production with a share of slightly over 20 per cent.

The president spoke with some pride when referring to the degree of price stability attained during a year of expansion. Although production plant worked to capacity, prices remained, on the whole, steady, he said, and both consumers' stocks and new orders stayed at a normal level. The schedule prices of most products remained below the British and American home prices, he claimed. Since the introduction of the Common Market, average steel prices had, in general, shown greater stability in the Community than in the United Kingdom and the United States. In terms of a constant rate of exchange, they rose by only 4 per cent. in the Community as against 18 per cent. in the United Kingdom and as much as 40 per cent. in the United States. Over the same period, the general wholesale price index for industrial products rose in the Community by 8 per cent. But while rejoicing that the Community was successfully maintaining its competitive position in the world markets, Mr. Malvestiti noted that competition from Japan was becoming increasingly keen.

Among the effects of the investment policy followed by the Community iron and steel enterprises at the prompting of the High Authority the president instanced the improvement of the pig-iron/steel production ratio, which had been dropping steadily since 1955, but began to increase again in 1960. Although it is still on a moderate scale, this movement is noted by the High Authority with satisfaction as an indication that the pattern of the Community's iron and steel production is gradually becoming better balanced than in the past, and that it is now less dependent on an unstable and speculative scrap market. At the same time, the Community has managed to swell the internal supply of collected scrap, which rose in 1960 by 1,750,000 tons above the 1959 level.

The High Authority is disturbed at the fact that the market for pig-iron has been noticeably affected by the pressure of supplies imported from third countries. These supplies, it is complained, have come in at exceptionally low prices, particularly where foundry pig-iron and ferro-manganese have been concerned. Doubts are expressed as to whether these imports are being contracted for "on a proper commercial basis," and the High Authority has raised the question with the Council of Ministers.

On the whole, the president of the High Authority appeared to be well satisfied with the progress made by the Community since the Schuman plan was launched more than 10 years ago. Industrially, and in tackling the social problems encountered, the Community has certainly made great strides in perfecting the Common Market. Politically, he could not claim a great advance, but he was hopeful nevertheless, and proclaimed once more his belief in the benefits the Community has already brought into being in Europe, and its value in a troubled world. A united Europe is still a living concept in the eyes of the leaders of the Community.

First Rolling Mill for Kenya Steel Industry

PLANS are being made by a Mombasa firm for the construction of East Africa's first steel rolling mill. The mill will cost £1,500,000 and will be built in about two years. It will have an initial capacity of about 50,000 tons a year and it is intended to meet all the requirements of Kenya in cold rolled sheet steel. The company concerned, Kenya Aluminium Works, Limited, already manufactures a wide range of household goods which are exported to other African and Middle East countries.

Through a newly created company, Mabati, the firm also intends to establish a complete galvanizing industry in Kenya with a capacity rising to 50,000 tons of corrugated galvanized steel sheets a year.

A director of the Kenya Aluminium Works, Mr. R. P. Chandaria, said that his company had been contemplating for some time parallel development of the aluminium and steel industries. At present it imported steel sheets, but later, when the new rolling mill was completed, it would manufacture its own from steel bars.

COMPLETION NEXT month is expected of a £1,000,000 scheme to supply eight of the estimated 14,000,000 gallons of replacement water a day needed initially by the Spencer steelworks of Richard Thomas & Baldwins, Limited, at Llanwern (Mon). Three electrically-driven pumps and 9½ miles of pipeline will be used. Water from the Severn tunnel springs is also to be piped to the site. This part of the scheme is expected to be completed in August.

Passing Thoughts . . .

IT is essential if British goods are not to be priced out of exports markets that they should be produced as economically as possible, and this cannot be done when factories are not working to capacity. Any steps taken to reduce home consumption, and any further burdens imposed on industry, such as a pay roll tax, are liable to have a disastrous effect on the export of many British products.—LORD RIDLEY, chairman of the Consett Iron Company, Limited.

Blind fanaticism and the desire for power know no sharper weapons than the fear and disunity of others.—MR. PIERO MALVESTITI, *president of the High Authority of the European Coal and Steel Community.*

Some people look upon profit making with aversion, but I suggest that, on reflection, such people would rather work for a concern making profits than for one making losses. I wish that the public at large (especially in this manufacturing country) could accept profit making as laudable, indeed as a duty.—MR. H. G. W. CHICHESTER-MILES, president of the Federation of British Rubber and Allied Manufacturers.

I may have displayed excessive zeal in trying to defend our movement from criticism levelled by outside bodies, but I certainly had no intention of bedevilling it.—MR. TED HILL, *chairman of the TUC.*

Fuel-using industries going over to oil are not pursuing a "vendetta against coal." They are trying to increase competitive power by raising efficiency and reducing costs.—The Journal, Newcastle-upon-Tyne.

Forecasting future fuel demand has gone out of fashion since actual fuel consumption inconveniently, and seemingly inexplicably, fell away some five years ago.—The Economist.

When we have studied for three years, we have to study another language. For us, English is the most popular—as Russian is for you.—DR. BORIS NAOMOV, a member of the staff of the Institute of Automation and Remote Control at the Russian Academy of Sciences, speaking to Hallam (Sheffield) Rotary Club.

One lady recently interviewed said of Bingo: "It's smashing! It gives you a chance to get away from the telly."—Daily Mail.

If a halt cannot be made in the rise in costs which seems to nullify each productive gain we make and if costs in other countries do not increase as fast as our own, we must become less competitive in the markets of the world. If this situation arises, then the Government may be forced to adopt further restrictive measures which, however necessary they may be, will tend to be self-defeating because unit costs will then rise. This is the economic dilemma of our country.—SIR CHARLES RENOLD, chairman of Renold Chains, Limited.

W. E. NORTON (MACHINE TOOLS), LIMITED, London, S.W.1.—Replying to a shareholder at the annual meeting, Mr. W. E. Norton, the chairman, said that although the recently-published figures of the Machine Tool Trades Association showed a slackening in demand, that had not been the company's experience. In the first six months of the current year earnings had "comfortably" doubled the corresponding figure for the previous year. Export trade was the "backbone" of the company and accounted for 40 per cent. of the current year's business.

Fall in Half-years' Steel Output

STEEL production in the first six months of the year amounted to 12,216,000 tons, compared with 12,386,000 tons in the first half of 1960, a fall of 1½ per cent., states the Iron and Steel Board. While production rose in Lincolnshire, on the North-east coast, and in the Midlands as a result of the increase since the early part of 1960 in demand and capacity for heavy steel products, output fell in Wales and Northamptonshire as a result of slackness in demand in the early part of 1961 for sheet, tinplate, and tubes.

Some revival in demand for sheet and tinplate is now apparent, says the board, and may provide rather brighter prospects for production in some areas during the latter part of the year. Output of pig-iron during the first half of 1961 reached 7,935,000 tons compared wtih 7,873,000 tons in the first half of 1960.

Production of steel in June was at the rate of 447,500 tons a week, compared with 466,100 tons a week in May, and with 466,400 tons a week in June, 1960. There was a continued weakness in demand during the month, states the board.

Latest pig-iron and steel output figures (in tons), with the corresponding 1960 returns, are shown in the following table:—

Period.	Pig-iron.		Steel ingots and castings.	
	Weekly average.	Annual rate.	Weekly average.	Annual rate.
1961—April ..	308,400	16,035,000	471,600	24,521,000
May	300,200	15,610,000	466,100	24,240,000
June ..	297,400	15,463,000	447,500	23,268,000
Half year ..	305,200	15,870,000	469,900	24,433,000
1960—April ..	310,600	16,150,000	478,100	24,861,000
May	299,100	15,554,000	475,400	24,723,000
June ..	299,500	15,353,000	466,400	24,255,000
Half year ..	302,800	15,745,000	476,400	24,772,000

Steel Managers Discuss Common Market

THEME of a management course held last weekend at the British Iron and Steel Management College, Ashorne Hill, near Leamington Spa (Warwicks), was "The Impact of European Integration on the British Iron and Steel Industry." It was attended by a selection of the 550 managers who have attended courses at the college since 1956.

Guest speakers included Dr. E. N. van Kleffens, head of the delegation of the High Authority of the European Coal and Steel Community in the UK, M. Pierre van der Rest, chairman of the Belgian Steel Federation, and Mr. C. R. Wheeler, president of the British Iron and Steel Federation.

Mr. Wheeler commented that the British steel industry is confident of its ability to compete with the members of the European Coal and Steel Community on a fair basis. It is, however, the effect of joining the Six on the home buyers of steel, which will be most important to the steel industry. If joining the Common Market is good for them it will be good for the steel industry.

OXLEY ENGINEERING COMPANY, LIMITED—Mr. S. Stansfield has been appointed deputy chairman and managing director.

English Steel's New Works

WILL ENHANCE BRITISH STEELMAKING PRESTIGE

TWO ceremonies of considerable importance, not only to the English Steel Corporation, Limited, but also to Sheffield and the British steel industry generally, took place last Friday. Viscount Knollys, chairman of Vickers, Limited, and of ESC, poured the first skip of concrete for part of the foundations of a new £26,000,000 steelworks at Tinsley Park, scheduled to be in operation by the last quarter of 1962 and, later in the day, at the River Don Works, commissioned the largest electric arc melting furnace in operation in the UK.

The Tinsley Park Works is the largest development of its kind ever undertaken within Sheffield city boundaries. Already nearly 3,000,000 tons of earth have been moved on the 500-acre site and consolidated into terraces where buildings soon to be erected will house electric arc melting furnaces and blooming, billet, and bar mills. With this additional melting capacity English Steel's production of alloy and special carbon steel will be increased to nearly 1,000,000 ingot tons a year and billet and bar production will be trebled.

Performing the rather unusual inaugural ceremony, Lord Knollys recalled that it was more than 100 years ago that Vickers and Cammells began making steel in Sheffield and their descendant, English Steel, was now beginning a great new venture.

What British Industry Needs

Paying tribute to his predecesor as chairman of the corporation, the late Sir Frederick Pickworth, and to his colleagues on the board for their foresight in 1954 in securing the site, Lord Knollys said that it was now almost the last outpost of countryside within the Sheffield boundaries. It was disappearing—but in a great cause—that of industrial wellbeing of this country and its ability to compete in world trade.

He felt very strongly that what British industry needed most now was the greatest possible competitiveness, through the most modern plant, the newest methods, the most competitive prices, and the finest workmanship. ESC was providing at Tinsley the most up-to-date plant with its two 100-ton electric furnaces, 42-in. blooming mill, two 32-in. billet mills and bar mills and of a size to give the best economic results. The plant would increase ESC production of alloy and special carbon steels to nearly 1,000,000 tons a year. This had been done to replace obsolete plant, to be able to meet increasing demand for their products—in other words, to ensure that they remained competitive.

The new Tinsley Park rolling mills were scheduled to begin operation by the end of 1962. "I believe that the reputation of ESC, of all the contractors concerned, and indeed of British industry abroad, would be strikingly enhanced if the scheme were to be completed and the plant in operation not merely on time according to the programme but even before the planned date. Such a thing has been done," said Lord Knollys.

Later, about a mile away at the River Don Works, Lord Knollys commissioned the 80-ton electric arc furnace, installed, he said, in order to produce large electric steel ingots of improved quality to meet increasingly stringent specifications. Improved deliveries would be possible because of the shortened heat treatment times required for vacuum treated steel as compared with steel cast by conventional methods. The furnace, which can melt 80 tons of steel in only three hours, has been designed for the production of special alloy steels and, in particular, for casting in vacuum. Working in conjunction with other melting furnaces it will enable English Steel to produce hydrogen-free ingots of up to 180 tons—greatly superior to those cast in air.

Mr. George P. Tinker, chairman of Birlec-Efco (Melting), Limited, which supplied the new plant, said that his firm's association with English Steel dated back for more than 30 years. During that period the two founder members of Birlefco had supplied the whole of English Steel's arc melting equipment which amounted to a total of 15 furnaces. The present furnace was the largest in operation in this country and, he believed, the largest in the Commonwealth. Birlefco had been entrusted with the order for two further arc furnaces for the new Tinsley Park works.

Price Pearson Refractories Acquisition

CONTRACTS have been exchanged, state the directors of Price Pearson Refractories, Limited, for the acquisition by the company of the whole of the issued capital of the West Hunwick Silica & Firebrick Company, Limited, and its subsidiary, Chapel Fell Ganister Company, Limited. The purchase consideration is the issue of 495,000 1s. ordinary shares in Price Pearson and the payment of £376,250 in cash.

To finance the acquisition and to provide resources for further expansion of the group it is proposed to make a rights issue of one for two ordinary shares of 1s. each at 4s. per share, together with 94,033 excess shares to bring the issued capital to a total of £400,000. Price Pearson expects to recommend a dividend for the year to March, 1962, of 27½ per cent. and a 2½ per cent. capital distribution, tax free, on the capital as increased to £400,000.

During the last few years, it is stated, West Hunwick has rebuilt its silica works at Hunwick (Co. Durham) and is now building an entirely new works of the most modern construction for producing magnesite chrome and other basic bricks. In the opinion of the Price Pearson board the acquisition will greatly strengthen the resources of both companies and the future prospects of the group.

Personal

British Non-ferrous Metals Federation President

A MEMBER of the original drafting committee which drew up the rules and constitution of the British Non-Ferrous Metals Federation in 1945, Mr. HENRY FOXWELL SHERBOURNE, has been elected its president for 1961-62. He is managing director of Yorkshire Imperial Metals, Limited, and Yorkshire Copper Works (Holdings), Limited, and succeeds as president, Mr. W. W. Dolton, managing director of the Delta Metal Company, Limited.

Mr. N. I. BOND-WILLIAMS, Aston Chain & Hook Company, Limited, Mr. C. H. M. HOLDEN, Charles Clifford, Limited, Mr. W. F. SLATER, Thomas Bolton & Sons, Limited, and Mr. G. A. D. SMITH, metals division of Imperial Chemical Industries, Limited, have been appointed vice-presidents and Mr. W. F. BRAZENER, the Mint, Birmingham, treasurer.

Mr. GARNET JONES, general manager of the Trostre works of the Steel Company of Wales, Limited, has been appointed a Justice of the Peace.

SIR WALTER DRUMMOND, deputy chairman of the National Coal Board from 1951-55, has received the honorary degree of Doctor of Civil Laws from the University of Durham.

Mr. J. H. W. MARGETTS, group managing director of Williams & Williams, Limited, metal window and door manufacturers, etc., of Chester, has been co-opted to the Council of the Modular Society.

Chairman of the Imperial Chemical Industries, Limited, Mr. S. P. CHAMBERS will open the 1961 National Conference of the British Institute of Management, which is being held at Torquay from October 24-26.

Mr. D. L. DOWIE has retired from Bewick, Moreing & Company, Limited, consulting mining engineers, of London, E.C.2, which is being continued by the remaining partners, Capt. A. H. Moreing and Mr. G. M. S. Leader.

Mr. JAMES W. RODGERS, sales and service officer of the North-Western Gas Board, has been elected chairman of the North West divisional council of the Clean Air Society. He takes over the two-year appointment from Mr. S. N. Duguid.

DURHAM AREA secretary of the National Union of Mineworkers, Mr. S. Watson has completed 25 years' service as a full-time county official of the organization. Previously he was secretary of Boldon Colliery (Co. Durham) miners' lodge.

Mr. M. J. NOONE and Mr. S. R. CHETWYND ARCHER have been appointed joint general managers of Whessoe, Limited, oil, gas and chemical plant manufacturers, of Darlintgon. Mr. A. G. GRANT, managing director, who is in indifferent health, will be on sick leave during the next three months.

Senior medical officer of Steel Peech & Tozer, branch of the United Steel Companies, Limited, Rotherham, Dr. R. A. TREVETHICK is to give a lecture at the annual conference at Liverpool this month of the British Council for the Rehabilitation of the Disabled. His subject will be rehabilitation in the steel industry.

Prof. W. B. R. KING, FRS, Woodwardian Professor of Geology, Cambridge University, 1943-55 and Yates Goldsmid Professor of Geology at University College, London University, 1931, has been re-appointed a member of the Central Advisory Water Committee by Mr. Henry Brooke, Minister of Housing and Local Government. Also reappointed is Prof. F. W. SHOTTON, FRS, Professor of Geology, University of Birmingham since 1949.

Director and sales manager of Whessoe, Limited, builders of capital plant for the oil, atomic power, gas and chemical industries, of Darlington (Co. Durham), until his resignation some months ago, Mr. J. W. MARTIN has received a retirement gift of £12,000. He served with the firm for 37 years and had been a director for 10 years.

Soviet Minister for Foreign Trade, Mr. N. S. PATOLICHEV, visited the Walker naval yard of Vickers-Armstrongs (Shipbuilders), Limited, on Tyneside yesterday (Thursday), where he was welcomed by Maj-Gen. Sir CHARLES DUNPHIE, chairman. The Vickers group is currently carrying out a number of engineering contracts in Russia.

Mr. R. W. BAILEY, director and works manager of K.L.G. Sparking Plugs, Limited, has been elected chairman of the Kingston Area Productivity Association. KLG thus scores a productivity "double," for Mr. C. G. MARTIN, works manager of the company's ceramics plant at Treforest, South Wales, is chairman of Cardiff and District Productivity Committee.

For the last 17 years divisional officer in Sheffield of the Iron and Steel Trades Confederation, Mr. WILLIAM EDWARD STEAD is to retire in November. Before going into full-time trade unionism he worked for Dorman Long & Company, Limited, Middlesbrough. He will be succeeded by Mr. E. ROBERTS, a divisional organizer at the Sheffield office, where he has worked for 17 years.

Responsible for the planning, construction, and major extensions at the Trostre and Velindre works of the Steel Company of Wales, Limited, Mr. A. J. WILLIAMS, chief engineer, developments, of the company's tinplate division, has retired after 50 years in the industry. He worked on the design and construction of the first hot-strip mill and cold reduction tinplate plant in Europe, the Ebbw Vale Works.

After 51 years' service with Crookes, Roberts & Company, Limited, manufacturers of beater and refiner bars, Mr. ARTHUR PARSONS, director and general manager, will be retiring at the end of this month. At an informal dinner party last Friday, the chairman of the parent company, the Tempered Group, Limited, Mr. Gerard Young, presented Mr. Parsons with a gold cigarette case. Mr. Young recalled how Mr. Parsons had pioneered several improvements in the firm's products, including the use of stainless steel for beater bars, in spite of Hardy Crookes' opposition, and how in the course of 50 years he had acquired an immense specialized knowledge. Mr. Parsons, who will continue as consultant, will be succeeded by Mr. MICHAEL CROMEY-HAWKE.

From Office Boy to General Manager

AFTER 51 years with Manchester electric wire and cable makers, W. T. Glover & Company, Limited, Mr. J. H. Maxwell, director and general manager, has retired. He started work with the company in 1910 as an office boy. He became general sales manager in 1954, joined the board the following year, and was made general manager in 1959.

His successor is Mr. E. P. G. Thornton, a director and deputy general manager, who has been with W. T. Glover since 1939. He was made a director with the executive responsibilities of joint assistant general manager last year. Mr. W. R. Gibb, director and joint assistant general manager, becomes assistant general manager.

Opportunity in the Far East

CAPITAL GOODS AND TECHNICAL ASSISTANCE

DEVELOPMENT plans of the South-East Asian countries offer great opportunities to suppliers of capital goods, but the attempt to supply will often fail unless the supplier is prepared to co-operate in technical assistance. This is one of the conclusions of the British South-East Asia Trade Delegation's joint report, A Trade in Transition, which adds: "It is essential that British firms participate from the beginning in the development plans of the individual countries of South East Asia, so that a pattern of trade favourable to Britain will emerge as the countries progress."

"In approaching the markets of South-East Asia," the report says, "we should not simply adopt the spirit of an export drive. The region cannot be treated as though it were the American or European market. Its independence is new, its fear of a new form of 'exploitation' is strong. Many British firms are working in the spirit of collaboration. It is this spirit which is required."

The delegation, sponsored by the Board of Trade and the Federation of British Industries, was organized by the federation. Its members, in four separate missions, visited Malaya and Singapore, the Philippines, North Borneo and Sarawak, Thailand and Burma, and Indonesia during April. Afterwards, the delegation met together in Singapore for a co-ordinating conference.

Causes of Failings

The report says that while Britain's long-standing connections with the region are of immense benefit to our trade, they inevitably bring the spirit of "our company has been trading with these countries from father to son for generations, and what did for them will do for us today." This attitude, it is thought, is the background to previous failings in the area.

Stressing the need for technical assistance at every point in the process of trade, the report says that British firms will need to co-operate still more closely with their agents in the training of technical personnel, and to co-operate more than ever in the setting up of training schools and demonstration centres in the use of products they wish to sell.

"They will need to take still greater trouble and show still greater patience with the often inexperienced Asian visitor and purchaser, and compete in offering favourable terms for the service of engineers in the erection of projects. They will need not simply to instal plant, but to ensure that it works, both by technical and managerial assistance."

Detailed sections of the report are devoted to the various countries visited. In Thailand, British manufacturers have had a fair share of purchases for local factory installations, and have won contracts for electric transformers and telephone cabling, but the West Germans have recently achieved a still higher score in providing complete factories. In diesel engines and generator sets we have also lost some ground to the Germans. In general, the Thais prefer slow speed engines, and these are in many ways more suitable for this type of market. The country is a major field of British iron and steel exports, but "the market is swinging to the Japanese on price."

In Burma, mining is carried out by two joint venture corporations, the Burma Corporation (1951), Limited, the Anglo-Burma Tin Corporation (1936), Limited, and oil production by a third, the Burma Oil Company, and a fair amount of equipment is required at the moment, particularly jigs, pumps, screens, tables, and cyclones. The Minister for Industry said he would welcome interest by a British group in investigating the mining equipment position in Burma.

In the field of industrial chemicals and plant, there is a fair market for the commoner inorganic chemicals, explosives for mining, and thermoplastic materials, and Britain appears to be holding her own in these fields against continental competition.

In Singapore, controversy centres round the plan to establish a steel plant in the industrial estate of Jurong. The mission discussed the project with the UN Technical Advisory Bureau team which is studying the project. There are three possibilities. The first stage of a small plant based in shipbreaking; a second stage, a small steel plant which would need electric furnaces; and a third stage, a fully integrated plant, is limited by the difficulty of finding export markets for a production of 500,000 tons.

The report says that the use of so much British industrial equipment in Singapore and Malaya is in favour of British suppliers so long as British manufacturers give a proper and prompt service. Criticism was levelled against delays in correspondence and quotations. The contracting industries in both countries are well established, and there are major works where international contractors will probably be needed, such as port works, hydro-electric, and thermal stations and process plants.

In the Philippines, a largely American-dominated market where British equipment is not generally well known, there are possibilities for the sale of processing equipment for light industry, and for wood working machinery, machine tools, electrical equipment, and certain types of mechanical handling plant and machinery. There appears to be a market for good and high-class British hand tools, small power tools and small equipment.

The section on Indonesia reports that coal is mined principally at Bukit Asam in South Sumatra and at Ombilin in Central Sumatra, and both of these mines are scheduled for re-equipment and/or expansion. Much interest was shown in the possibility of buying more British equipment some of which has been purchased intermittently over the last 10 years and is highly regarded. It is planned to increase production from the present level of 400,000 tons annually to 1,400,000 tons, and a "shopping list" prepared by BUPPTAN, the organization responsible for mining, contains items of mining and coal handling equipment with a total estimated c.i.f. value of about £7,000,000 together with coal carrying ships to the value of about £9,500,000.

Appointments

New Executive Posts at Vickers

CHANGES in organization and new appointments are announced by the Vickers group. In Vickers, Limited, a new category of head office executives has been established, with the following appointments:—Comptroller, Mr. J. H. ROBBIE; controller of research, Dr. C. F. BAREFORD, who retains his appointment as managing director of Vickers Research, Limited.

Mr. N. H. JACKSON, becomes controller of contracts, and Mr. J. G. LLOYD, controller of forward development. Each of the above officers will be responsible to a director of Vickers, Limited.

Mr. HARRY LAVELLE has been appointed wages and control officer for the No. 3 Area of the Northern (N&C) Divisional Coal Board.

A member of the London sales staff of Small & Parkes, Limited, for the last 12 years, Mr. D. H. LINDLEY has been appointed contracts manager.

Mr. NEVILLE ROBINSON has been appointed to the new post of assistant director of the Electrical Development Association, and will take up his duties in September.

Mr. C. J. POWERS has been appointed assistant manager, contracts division, of the industrial department of York Shipley, Limited, refrigeration engineers, of London, N.W.2.

Mr. F. HOLLOWAY, secretary of the Workington Iron & Steel Company, Limited, has taken over in addition the post of office manager in succession to Mr. W. McGregor, who has retired.

Mr. R. W. HENLY-STUART has been appointed sales manager for the Southern region by the Nuralite Company, Limited, a member of the British Uralite, Limited, group, asbestos goods manufacturers, of Gravesend (Kent).

Sir HAMISH MACLAREN, former director of electrical engineering at the Admiralty, has been appointed a consultant to Associated Electrical Industries, Limited. He will advise on all matters concerning electrical equipment for ships.

Following the appointment of Mr. H. B. Morris to the board, Mr. H. ANDREWS has been appointed secretary and Mr. H. L. HUDSON chief accountant of Wickman, Limited. Mr. Andrews joined Wickman in 1937 and Mr. Hudson in 1952.

Sir ANDREW COHEN has been appointed Director-General of the Department of Technical Co-operation, and will be the permanent official head of the new Government department. Sir Andrew was Governor of Uganda for five years, and then became permanent British representative on the Trusteeship Council of the United Nations.

PLANS FOR THE opening by the Duke of Edinburgh of the new £400,000 fuel technology and chemical engineering building at Sheffield University, which was to have taken place on July 19, have been cancelled and no alternative date has been fixed. Because of his recent leg injury, the Duke has had to cancel all his engagements for a fortnight and the arrangements for his visit to Rotherham, to open the new College of Technology, have also been postponed.

Pit-to-Port Coal Leadage Increases

WITH effect from July 3, the British Transport Commission has increased freight charges to the National Coal Board on coal traffic from the collieries to the various seaborne loading ports. The NCB is passing on these increases to its customers by raising f.o.b. prices for seaborne coal in amounts varying between 5d. and 2s. 4d. per ton for different ports of loading.

Members of the Seaborne Coal Traders' Association regard the increases as discriminatory. While recognising that one of the main preoccupations of the British Transport Commission at the present time is to find ways and means of making the railways pay, they express great concern that the increases are being applied to this class of traffic, tied as it is to rail for its transportation from the pits to the ports of loading.

The Seaborne Coal Traders' Association feels that apart from the fact that a dangerous precedent has been created, one of the effects of the increases will be to prejudice still further the competitive power of coal in areas where it has already suffered severely from the competition of fuel oil.

West Midlands NCB "Overtakes" 1960

FOR the first time this year, monthly output in the West Midlands Division of the National Coal Board has exceeded the corresponding figure for last year—and with a much smaller labour force. In June, saleable output was 5,882 tons, or about 0.5 per cent. higher than a year earlier, while manpower was down by 3,386, or 7.5 per cent. The gap in output compared with 1961 was narrowed month by month in the first half of this year.

Record-breaking in productivity is rare in June, but last month West Midland mineworkers set three new figures. In the division as a whole, overall OMS rose to 30.3 cwt., a fractional increase over the previous month. The same figure was recorded in North Staffordshire Area, where there was an improvement of half a hundredweight on the previous best performance in February. In South Staffordshire and Shropshire Area, the record set up in March was exceeded by more than half a hundredweight to 28.8 cwt.

A number of records in the second quarter of the year was also an unusual event. Coal face productivity in the division rose by nearly 1 cwt. to 95.6 cwts. OMS at the face in Cannock Chase Area rose by 4 cwt. to 98.9, and the overall figure by nearly three quarters of a hundredweight to 31 cwt. In North Staffordshire Area, the coal face figure rose by nearly 2 cwt. to 102.3, and OMS overall increased fractionally to 29.7 cwt.

KEITH BLACKMAN, LIMITED, mechanical and electrical engineers, manufacturers of fans, gas-heating apparatus, etc., of London, N.7—Group trading profit for the year ended March 31, 1961, was £259,616 (£218,277), and the figure after increased tax is £123,456 (£122,410). The directors recommend that the dividend be held at 17½ per cent. Orders on hand at the close of the year were "very substantial" states the chairman, Mr. Donald S. Woodley, and if the present level is maintained it should ensure all the works operating at maximum capacity.

MP Seeks Pits Inquiry

OUTPUT TARGETS AT CYNHEIDRE AND ABERNANT

CONSERVATIVE MP for Cardiff North, Mr. Donald Box, is to press the Minister of Power to instigate an independent inquiry into the geological difficulties facing two modern collieries—the £13,000,000 Cynheidre Colliery, near Llanelly, and the £10,000,000 Abernant Colliery in the Amman Valley. He said on Monday that he would ask the Minister for a full inquiry into the situation following a letter he received from Lord Robens, chairman of the National Coal Board, over the weekend. He would ask for the findings to be made public.

Mr. Box said that in his letter Lord Robens had said that the Cynheidre Colliery was expected to produce some 15,000 tons of anthracite this year, although the original scheme was based on an output of 1,000,000 tons a year.

The letter stated that the immediate production objective for the new colliery had been reduced to 550,000 tons a year because of difficult geological conditions. The board expected about 50,000 tons to be produced this year at Abernant Colliery, but the authorization for this new colliery was based on an ultimate output of 720,000 tons a year, Mr. Box said.

"Cause for Concern"

"While I have no wish to harry the Coal Board over this matter," Mr. Box said, "the information given in answer to my questions gives me great cause for concern. Here are two mines, built with public money to the tune of some £23,000,000, and production seems likely to reach only a fraction of the targets on which the expenditure was originally authorized. This raises a number of important issues.

"Did the planners blunder when the original geological surveys were made? How do the production costs compare with the original estimates? Answers to these questions must be given . . . I am suggesting that it is an alarming state of affairs and that an independent inquiry be held straight away, even if it is only for the Minister's own satisfaction."

At the official opening of Cynheidre in November, 1960, it was reported that the mine would reach the end of its first phase of development by 1963 and it was hoped that by then it would be producing 550,000 tons of saleable anthracite a year. Further expenditure might then be undertaken to raise the annual output to 900,000 tons.

Mr. Box's demand for an inquiry met with immediate criticism from the National Coal Board and the Welsh miners. A spokesman for the South-Western Divisional Coal Board, pointing out that production had only recently begun at the two collieries, said they could not be expected to reach full production for at least two years. He said that after early boring for the Cynheidre Colliery, the final output had been roughly assessed at possibly 900,000 tons of anthracite a year. After sinking three shafts and assessing the coal reserves, the modified limited objective was stated to be 500,000 tons. This had been a more practical objective. The spokesman added that Mr. Box had raised the matter without consulting the Divisional Board.

After a meeting on Tuesday of the executive committee of the South Wales mineworkers, Mr. W. Whitehead, Area president, accused Mr. Box of causing alarm. He said that because of the uncertainties about security of employment brought about by his statement and demand for an investigation, miners now going on holiday had said they would not return.

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Appointments

New Executive Posts at Vickers

CHANGES in organization and new appointments are announced by the Vickers group. In Vickers, Limited, a new category of head office executives has been established, with the following appointments:—Comptroller, Mr. J. H. ROBBIE; controller of research, Dr. C. F. BAREFORD, who retains his appointment as managing director of Vickers Research, Limited.

Mr. N. H. JACKSON, becomes controller of contracts, and Mr. J. G. LLOYD, controller of forward development. Each of the above officers will be responsible to a director of Vickers, Limited.

Mr. HARRY LAVELLE has been appointed wages and control officer for the No. 3 Area of the Northern (N&C) Divisional Coal Board.

A member of the London sales staff of Small & Parkes, Limited, for the last 12 years, Mr. D. H. LINDLEY has been appointed contracts manager.

Mr. NEVILLE ROBINSON has been appointed to the new post of assistant director of the Electrical Development Association, and will take up his duties in September.

Mr. C. J. POWERS has been appointed assistant manager, contracts division, of the industrial department of York Shipley, Limited, refrigeration engineers, of London, N.W.2.

Mr. F. HOLLOWAY, secretary of the Workington Iron & Steel Company, Limited, has taken over in addition the post of office manager in succession to Mr. W. McGregor, who has retired.

Mr. R. W. HENLY-STUART has been appointed sales manager for the Southern region by the Nuralite Company, Limited, a member of the British Uralite, Limited, group, asbestos goods manufacturers, of Gravesend (Kent).

Sir HAMISH MACLAREN, former director of electrical engineering at the Admiralty, has been appointed a consultant to Associated Electrical Industries, Limited. He will advise on all matters concerning electrical equipment for ships.

Following the appointment of Mr. H. B. Morris to the board, Mr. H. ANDREWS has been appointed secretary and Mr. H. L. HUDSON chief accountant of Wickman, Limited. Mr. Andrews joined Wickman in 1937 and Mr. Hudson in 1952.

Sir ANDREW COHEN has been appointed Director-General of the Department of Technical Co-operation, and will be the permanent official head of the new Government department. Sir Andrew was Governor of Uganda for five years, and then became permanent British representative on the Trusteeship Council of the United Nations.

PLANS FOR THE opening by the Duke of Edinburgh of the new £400,000 fuel technology and chemical engineering building at Sheffield University, which was to have taken place on July 19, have been cancelled and no alternative date has been fixed. Because of his recent leg injury, the Duke has had to cancel all his engagements for a fortnight and the arrangements for his visit to Rotherham, to open the new College of Technology, have also been postponed.

Pit-to-Port Coal Leadage Increases

WITH effect from July 3, the British Transport Commission has increased freight charges to the National Coal Board on coal traffic from the collieries to the various seaborne loading ports. The NCB is passing on these increases to its customers by raising f.o.b. prices for seaborne coal in amounts varying between 5d. and 2s. 4d. per ton for different ports of loading.

Members of the Seaborne Coal Traders' Association regard the increases as discriminatory. While recognising that one of the main preoccupations of the British Transport Commission at the present time is to find ways and means of making the railways pay, they express great concern that the increases are being applied to this class of traffic, tied as it is to rail for its transportation from the pits to the ports of loading.

The Seaborne Coal Traders' Association feels that apart from the fact that a dangerous precedent has been created, one of the effects of the increases will be to prejudice still further the competitive power of coal in areas where it has already suffered severely from the competition of fuel oil.

West Midlands NCB "Overtakes" 1960

FOR the first time this year, monthly output in the West Midlands Division of the National Coal Board has exceeded the corresponding figure for last year—and with a much smaller labour force. In June, saleable output was 5,882 tons, or about 0.5 per cent. higher than a year earlier, while manpower was down by 3,386, or 7.5 per cent. The gap in output compared with 1961 was narrowed month by month in the first half of this year.

Record-breaking in productivity is rare in June, but last month West Midland mineworkers set three new figures. In the division as a whole, overall OMS rose to 30.3 cwt., a fractional increase over the previous month. The same figure was recorded in North Staffordshire Area, where there was an improvement of half a hundredweight on the previous best performance in February. In South Staffordshire and Shropshire Area, the record set up in March was exceeded by more than half a hundredweight to 28.8 cwt.

A number of records in the second quarter of the year was also an unusual event. Coal face productivity in the division rose by nearly 1 cwt. to 95.6 cwts. OMS at the face in Cannock Chase Area rose by 4 cwt. to 98.9, and the overall figure by nearly three quarters of a hundredweight to 31 cwt. In North Staffordshire Area, the coal face figure rose by nearly 2 cwt. to 102.3, and OMS overall increased fractionally to 29.7 cwt.

KEITH BLACKMAN, LIMITED, mechanical and electrical engineers, manufacturers of fans, gas-heating apparatus, etc., of London, N.7—Group trading profit for the year ended March 31, 1961, was £259,616 (£218,277), and the figure after increased tax is £123,456 (£122,410). The directors recommend that the dividend be held at 17½ per cent. Orders on hand at the close of the year were "very substantial" states the chairman, Mr. Donald S. Woodley, and if the present level is maintained it should ensure all the works operating at maximum capacity.

MP Seeks Pits Inquiry

OUTPUT TARGETS AT CYNHEIDRE AND ABERNANT

CONSERVATIVE MP for Cardiff North, Mr. Donald Box, is to press the Minister of Power to instigate an independent inquiry into the geological difficulties facing two modern collieries—the £13,000,000 Cynheidre Colliery, near Llanelly, and the £10,000,000 Abernant Colliery in the Amman Valley. He said on Monday that he would ask the Minister for a full inquiry into the situation following a letter he received from Lord Robens, chairman of the National Coal Board, over the weekend. He would ask for the findings to be made public.

Mr. Box said that in his letter Lord Robens had said that the Cynheidre Colliery was expected to produce some 15,000 tons of anthracite this year, although the original scheme was based on an output of 1,000,000 tons a year.

The letter stated that the immediate production objective for the new colliery had been reduced to 550,000 tons a year because of difficult geological conditions. The board expected about 50,000 tons to be produced this year at Abernant Colliery, but the authorization for this new colliery was based on an ultimate output of 720,000 tons a year, Mr. Box said.

"Cause for Concern"

"While I have no wish to harry the Coal Board over this matter," Mr. Box said, "the information given in answer to my questions gives me great cause for concern. Here are two mines, built with public money to the tune of some £23,000,000, and production seems likely to reach only a fraction of the targets on which the expenditure was originally authorized. This raises a number of important issues.

"Did the planners blunder when the original geological surveys were made? How do the production costs compare with the original estimates? Answers to these questions must be given . . . I am suggesting that it is an alarming state of affairs and that an independent inquiry be held straight away, even if it is only for the Minister's own satisfaction."

At the official opening of Cynheidre in November, 1960, it was reported that the mine would reach the end of its first phase of development by 1963 and it was hoped that by then it would be producing 550,000 tons of saleable anthracite a year. Further expenditure might then be undertaken to raise the annual output to 900,000 tons.

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In Parliament

STEEL BOARD CHAIRMAN'S DUTIES

THERE would be no change in the responsibilities or duties of the part-time chairman of the Iron and Steel Board (Sir Cyril Musgrave), now that he was devoting less than his full time to the work of the board, MR. J. C. GEORGE, Parliamentary Secretary to the Minister of Power, told MR. KENNETH LEWIS (Con.). With the approval of the Treasury, he added, the Minister had fixed the chairman's salary at the reduced rate of £6,000 a year.

MR. LEWIS suggested that it was odd that the Minister of Power who was responsible for the iron and steel, electricity, gas, coal, and the whole range of power industries should be receiving less salary than the part-time chairman of the Iron and Steel Board. MR. GEORGE said the chairman would be doing exactly the same work as when he was full-time, and would only be devoting less than his full time to the job. The salary payable was commensurate with the importance of the work.

GAS FROM COAL

APPOINTMENT of a committee to consider and report on the mining of coal under built-up areas, and on the feasibility of extracting gas from the coal measures under towns and cities without mining the coal was urged by Mr. W. T. PROCTER (Lab.).

MR. RICHARD WOOD, Minister of Power, in a written reply, said he had decided there would be no advantage in appointing a committee to consider matters for which existing legislation made reasonable provision. The work already done on underground gasification had shown that it was most unlikely to prove an economic method of exploiting coal reserves in this country.

ANTHRACITE PRICES

QUESTIONED by MR. JAMES GRIFFITHS (Lab.) about the average cost at the pithead of anthracite in 1959, and the average retail price of anthracite in that year, MR. RICHARD WOOD, Minister of Power, said he had asked the chairman of the National Coal Board to write to Mr. Griffiths about the pithead cost.

Since 1958, when coal control was discontinued, figures of retail anthracite prices had not been collected, MR. WOOD said. At the time of decontrol, the basic retail price of Welsh anthracite nuts ranged from £10 10s. in Swansea to £13 a ton in Newcastle.

NCB PRESS ADVERTISEMENTS

CAPT. HENRY KERBY (Con.) asked the Minister of Power if he would give a general direction to the National Coal Board and the Gas Council not to publish any further advertisements in the national Press drawing attention to the benefits from the nationalization of the coal and gas industries.

MR. RICHARD WOOD replied that if what was in mind was an advertisement which claimed that nationalized industries could improve their service to the public by enterprise and sensible co-operation, he could see no reason to disagree with this.

LURGI GAS PLANTS

PROSPECTS of producing more town gas by the Lurgi process, in addition to the one plant already producing and another which is being built, are being studied by the Gas Council and the National Coal Board, MR. RICHARD WOOD, Minister of Power, told MR. HAROLD NEALE (Lab.).

In reply to a further question from Mr. Neale, the Minister promised to give an early decision on the question of extending imports of liquid methane by the Gas Board, whose proposals he was studying.

Stourbridge Sheared Sheet Service

REPRESENTATIVES of some 150 light engineering companies from many parts of the country and members of the trade and technical Press were entertained by the Stourbridge Rolling Mills, Limited, on Tuesday at a works view day. The main purpose of the occasion was to give steel users the opportunity of seeing the company's latest addition to its range of products—the production and handling of sheared cold reduced sheet.

The finished material is continuously sheared to any required width in a 36-in. slitting line, from a parent coil which may weigh up to 9 tons. The product is not competitive with the company's conventional range of cold rolled steel strip which is finished with a closer surface and to tighter dimensional tolerances.

The visitors also had the opportunity of seeing the cold rolling plant and flat wire department of the Stourbridge Rolling Mills which now employs about 230 and has capacity for producing up to 20,000 tons per year of steel strip, heavy rolled flats, and flattened wire. Development plans are now going ahead to commission a new four-high precision rolling mill in the latter part of next year.

Through the co-operation of Humphris & Sons, Limited, the Rockwell Machine Tool Company, Limited, Yale & Towne Manufacturing Company, and Press Equipment, Limited, it was possible to see a well laid out display of production and press shop equipment and attachments and materials handling equipment.

Mr. M. A. Fiennes to Head Davy-Ashmore Board

BOARD of Davy-Ashmore, Limited, has designated Mr. M. A. Fiennes as chairman to succeed Mr. D. F. Campbell, who is retiring from the board at the annual meeting in September. Mr. Fiennes is group managing director of Davy-Ashmore and will continue in that office. Mr. L. H. Downs will become vice-chairman.

Mr. Campbell joined the board of Davy Brothers, Limited, in 1935 and became chairman of its successor, Davy-United, Limited, in 1944. Upon the merger with the Power-Gas Corporation, Limited, in 1960, Mr. Campbell agreed to continue as chairman of Davy-Ashmore, Limited, during the transition period.

While remaining chairman of Davy & United Engineering Company, Limited, one of the principal companies in the group, Mr. Fiennes has now relinquished his appointment as managing director of that company and Mr. M. F. Dowding has been appointed in his place. Mr. Dowding is already a director and was formerly general manager of the machinery division.

Major W. R. Brown, a former chairman of the Power-Gas Corporation, Limited, retired from that board prior to the merger in 1960, but joined the board of Davy-Ashmore to assist during the transition period. He will also retire at the annual meeting, but will remain a director of Ashmore, Benson, Pease & Company, Limited.

BARROW STEEL WORKS SOLD

£2,200,000 Paid To ISHRA by United Steel

THE Iron and Steel Holding and Realisation Agency (ISHRA) has sold to the United Steel Companies, Limited, its investment in Barrow Steel Works, Limited, consisting of the issued share capital of £100 and a loan of £2,380,652, for the sum of £2,220,000. The Ministry of Supply acquired the works from Barrow Haematite Steel Company, Limited, in 1943. It was managed by United Steel as agent. In 1951 the Iron and Steel Corporation of Great Britain took over the works from the Minister, and United Steel continued to manage it on behalf of the corporation, and subsequently the agency.

Before completion of the present sale, the Iron and Steel Holding and Realisation Agency cancelled £800,000 of loan already written off as irrecoverable in its books, reducing the amount owing by the company to the agency to £2,380,652. Since October 3, 1953, interest on the loan has been waived by the agency.

For the nine years ended October 1, 1960, the net losses of the steelworks resulted in a debit balance on the profit and loss account of over £850,000 at that date.

New Developments

A statement by United Steel points out that the company has managed the works since 1943 for a token remuneration. As a conventional steel producing unit the works has not been economic throughout this period. The re-rolling mills are not in themselves uneconomic but their steel requirements are not sufficient to support their own steelmaking furnaces, and their location prevents the regular acquisition of billets from other sources of supply.

In the hope of converting the works into a profitable undertaking, a pilot plant was installed in 1952 to carry out plant scale experiments in continuous casting. Since 1954 United Steel has borne the operating cost of the subsequent experimental work in view of its own interest in these developments.

The process is now working successfully, and two full-scale twin-strand continuous casting machines together with a 20-ton electric arc furnace are being installed. This plant is expected to come into production in the near future, and should provide billets at a cost which will enable the Barrow re-rolling mills to operate at a profit and so justify their continued existence. The scheme has been given the code name BARCON (Barrow Steel Works ARc Furnace CONtinuous Casting).

It is interesting to note, says the company, that Barrow, which in 1877 had the largest blast-furnace plant in the world and a total of 18 Bessemer converters, is now re-emerging as a pioneer. When BARCON is completed, it will be the first works in the world to be wholly dependent upon continuously cast steel for its rolling mills.

"The United Steel Company has, through its 18 years' association with Barrow, acquired some responsibility for this works, and for the community in which it operates. The expectation that the developments which they have sponsored will turn the works into an economic unit has made their acquisition and the continued acceptance of this responsibility justifiable. The greater part of the purchase price represents expenditure already incurred on the new plant and on stocks, etc., required for its operation."

Improved Outlook for John Thompson

CHAIRMAN of John Thompson, Limited, manufacturers of boilers and ancillary equipment, nuclear power plant fabrications, structural steelwork, etc., of Wolverhampton (Staffs), Sir Edward Thompson, says that given reasonable trading conditions, there is every prospect that the company may be able to resume ordinary dividends for 1961, possibly with an interim payable on November 1 next.

Work on hand at end-March, 1961, totalled £37,000,000, but with several large orders received in the last two months, the figure is now over £38,400,000. Output of the home companies for the first three months of 1961 shows a welcome 15 per cent. increase and orders booked by the manufacturing companies increased 30 per cent. for the same period.

Referring to the Berkeley atomic power station contract losses, Sir Edward says the main factor was that high wage rates on the sites were well in excess of those included in the original tender. He also maintains that had the company not been occupied on this work, it would have made a profit between £1,500,000 and £2,000,000 on other work. Of the loss, £1,215,000 was made within the John Thompson group and about £850,000 represents its probable share in the losses of the main contracting company, AEI-John Thompson Nuclear Energy, Limited.

RISING CANADIAN STEEL PRODUCTION

PLANTS of the Algoma Steel Corporation, Limited, of Canada, are currently operating at full capacity, and production and sales for the first six months of 1961 will probably be 10 per cent. ahead of the same period last year, Mr. David S. Holbrook, president, has announced. He thought this year's full production would exceed the 1960 ingot output of 1,278,000 tons.

Strong and increasing demand covering most of the items produced by Canadian steel mills is also reported by A. C. Leslie & Company, Limited, a leading Montreal steel and metal concern. Most of the increased production is due to heavier home demand, says the company.

FORMATION OF AN Anglo-Yugoslav Trade Council by the London Chamber of Commerce and the Federation of British Industries has been announced.

Nation Should be Thankful for Coal, Says Mr. W. L. Miron

THREAT to a large proportion of Britain's oil supplies in Kuwait was referred to on Saturday by Mr. W. L. Miron, chairman of the East Midlands Divisional Coal Board.

MR. W. L. MIRON

Speaking at the annual luncheon of the mining section of the Royal Institution of Chartered Surveyors at Leicester University, Mr. Miron said that the nation should be thankful for our indigenous fuel resources. They were, he said, untrammelled and unfettered by dangers which could come from other corners of the earth.

Turning to the importance of the mining surveyor, Mr. Miron said that solid-fuel users were looking to the East Midlands for the service the coalfield could give, and it could not give this service without the constant professional skill of the mining surveyor. Mr. E. C. Strathon, president of the RICS, said he was interested in the wellbeing of the mining section of the institution, whose members contributed to the most important industry in the country. The annual conference of the institution, which had been held during that week, had focused the general activities of all members of the institution, and together they gave a service to surveying as a whole.

Measures by Japan to Reduce Mine Accidents

IN Japan, where between 600 and 700 miners are killed each year in pit accidents, the adoption of scientific safety devices and the closure of hazardous coal mines to reduce mishaps is being pressed by the Government. During the first three months of this year, 226 miners died, including 71 in the worst mine disaster in Japan since the last war, at the Kamikiyo Mine in Kyushu, Japan's southernmost island.

Japanese mining companies are reported to spend on average two yen (100 yen equals 2s.) per ton of coal output on safety measures, or about one tenth of the amount spent in Germany and France. A Coal Mine Safety Measures Bill was recently submitted to the National Diet, and under the new law the Government will advise a company to close its mine if it is found incapable of meeting safety requirements. Some compensation, calculated on output, will be paid. About 50 mines are expected to be ordered to close by next March.

SUMMER SCHOOL of the Institution of Production Engineers will be held at the College of Aeronautics, Cranfield (Beds), from Tuesday, August 29, until Friday, September 1, and will include lectures on the inter-relation of work study, ergonomics, operational research and cybernetics and their application to production engineering. Inclusive fee for the school, covering accommodation and meals, is £10 10s.

Coal Chartering

MARKETS generally are inclined quieter, and this week has seen a reduction in the volume of tonnage fixed for coal from Hampton Roads to Japan. Charterers are presently interested in making forward contracts, and 8,500 tons was recently fixed Hampton Roads/Santos at $7.50 with the option of Rio de Janeiro at $6.75 for August 1/14. There are some possibilities to A.R.A., and Italian charterers could also be interested.

There is some inquiry from Wales and continental ports to the Mediterranean but such business is mainly for vessels of about 3/5,000 tons. There is also some interest from South Wales to Japan for coke breeze. Coasting rates are somewhat steadier and there is still quite a good demand from East Coast UK to the Scandinavian ports.

Owing to the rather poor market homewards from the Mediterranean, particularly for handy sizes, charterers may well be required to advance their outward rates in order to cover their requirements.

Minister to Co-ordinate Fuel Policy Urged

MINISTER with Cabinet rank should be installed to co-ordinate Britain's fuel policy, says Mr. Sam Watson, Durham Area secretary of the National Union of Mineworkers in his message to Durham Miners' Gala. "It is self-evident that as long as Britain has no co-ordinated fuel policy with a Minister of Cabinet rank, a large proportion of Britain's energy needs will be met from abroad, while beneath our feet is all the power we need."

Criticizing the oil, steel, and chemical industries, Mr. Watson says: "I wonder what some of these concerns would think if the Coal Board, which spends £250,000,000 a year on stores and equipment, suddenly decided to buy all its steel, equipment, stores, and so on in the cheapest market of the world. There would be a hullabaloo."

Mr. Watson says the loss of trading markets due to Imperial Chemical Industries, Limited, requiring oil and not coking coal for certain new processes and the Consett Iron Company, Limited, using oil and not coal would probably affect the demand for Durham coal.

COSTS LEVEL THE BRAKE ON HIGHER EXPORTS

SAYING that he did not believe that manufacturers as a whole in this country were uninterested in or insufficiently active in their search for business oversea, Mr. J. L. Steel, chairman of the British national committee of the International Chamber of Commerce, said recently that much had been done by way of exhortation to encourage British manufacturers to realize the need for increasing exports, but this did not really touch the core of the problem.

Mr. Steel, who was speaking at the annual meeting of the committee, said the hard fact was that costs of production were high because of a rapid increase in wages and salaries, which had outpaced the increase in general productivity. The present costs level were such that in many cases an increasing amount of exports could only be achieved at a loss.

The North Staffordshire coalfield has a bright future, but it will only remain competitive if the closure of small collieries is put into operation at the most opportune time. This was the message given to members of the North Staffs Branch of the National Association of Colliery Managers by Mr. R. W. Scurfield, the new branch president, during his address given on April 26, 1961. He is deputy Area production manager (planning), North Staffs Area, West Midlands Divisional Coal Board.

MEETING COMPETITION FOR CARBONIZATION COALS

Presidential Address to North Staffs Managers

by R. W. SCURFIELD, B.Sc., M.I.Min.E.

DURING the last six years the prospects of the North Staffordshire coalfield have altered substantially in that the spectacular increase in total output, amounting to an additional 50 per cent., is no longer envisaged, although the relative importance of the coalfield to the nation remains very great indeed. The tremendous reserves of coal in this geographically small coalfield are common knowledge. There are some 1,400,000,000 tons of coal down to a depth of 1,300 yd. in the proved coalfield. Of these reserves over half are in carbonizing coal seams lying between 900 yd. and 1,300 yd. in depth. It is these reserves of carbonizing coal which gave the coalfield such prominence in the original national plan of the NCB.

As recently as 1958 the national plan took into account a very substantial increase of output to be won in North Staffordshire by 1970. Total output was to be increased from just over 6,000,000 tons per annum to 9,000,000 tons by 1970, and the whole of this increase was to be obtained from carbonizing coal seams. To achieve this increased output, from workings as deep as any in the country, a very heavy capital investment was going to be necessary. It was thought that the demand for good quality carbonization coal was insatiable, and the high revenue which would be obtained would more than meet the high interest and depreciation charges inevitable with the development of new deep collieries.

The reconstruction programme then agreed for the coalfield included six major projects, so that, by 1970, 8,500,000 tons of the Area total output of 9,000,000 tons would be won from major reconstructed collieries. In 1958 the major projects at Florence and Hem Heath were well under way and the new shaft sinking at Wolstanton had been started the previous year. These three projects were to be followed as rapidly as possible by further major reconstructions at Chatterley-Whitfield, Holditch, and Stafford collieries.

Changes in Future Demand

The changes in the last few years of the estimates of future demand for coal, and for carbonization coal in particular, are all too familiar. The coal-mining industry no longer has a monopoly and must face competition from a variety of sources. For general-purpose coals, the main consumer is, and will be to an ever-increasing extent, the Central Electricity Generating Board. To meet competition from oil, nuclear power and hydro-electric developments, it is essential that the relative price of coal to the electricity generating industry should not rise. This elementary fact has been obvious for long enough. What has not been so widely appreciated is the intense competition which the production of carbonization coal must meet in the very near future. The demand for this fuel is now by no means insatiable and, as with general-purpose coal, will be governed by the price at which it can be marketed.

Considerable changes are taking place in the carbonization industry. In the gas industry the new Lurgi process is being developed which does not use coking coal at all, but relatively low quality general-purpose coal. A plant of this type is already under construction in Warwickshire. Methane has already been imported by tanker. Oil refinery gases are being widely used for enriching town gas. Natural gas is already piped across France. Proposals are being considered for the piping of natural gas from the Sahara to France—and the Straits of Dover is only 20 miles wide. In the steel industry there have already been con-

siderable economies made in the quantity of coke used per ton of steel manufactured, and developments are now going ahead which can result in a further spectacular reduction of some 40 per cent. in coke. All these developments mean that the cost of producing carbonization coal has become all important in deciding the future level of output of this type of coal for the country as a whole.

In addition to national competition with other fuels, the North Staffs coalfield has to face competition from other coalfields. If the total national demand for coal is diminishing, then the National Coal Board must plan to get the output required from the coalfields where coal can be produced most cheaply consistent with satisfactory quality. From a national standpoint this is inevitable, otherwise the industry will not remain competitive. This means that the future level of production of the coalfield must depend not only on the national situation but on its ability, for instance, to deliver general-purpose coal to the local power stations in competition with the East Midlands Division, or carbonizing coal to the steel and gas works in competition with other divisions with the disadvantage of longer hauls.

Bright Prospects

Of the ability of this coalfield to meet this competition in the long run there is no doubt at all. The prospects in the coalfield are very bright. Of the three major reconstruction schemes, the Wolstanton concentration scheme will be completed in a little over 12 months' time. At Hem Heath Colliery the upper horizon is fully developed and production is about to start on the lower horizon. At Florence, No. 1 shaft will give the colliery a substantial increase of capacity from the lower levels when the shaft is commissioned in September this year. While the full benefits of the money spent at Wolstanton should be attained in a little over 12 months' time, both Hem Heath and Florence will require longer to pay off owing to the necessity for underground development to build up the output. It may therefore be two to three years before the full benefits of the large sums of money currently being invested in the major reconstruction schemes of this coalfield are achieved.

The same is true of the considerable amount of modernization work about to be undertaken in the coalfield which has not received as much publicity as the larger projects. Examples of this modernization work are the schemes for the electrification of winders at Norton and Victoria collieries which are about to be put in hand; the new coal preparation plant about to be built at Silverdale; and modernization of the existing coal preparation plant at Holditch. Preparations are also in hand to provide a completely new coal preparation plant, sidings layout, and landsale arrangements at Chatterley-Whitfield Colliery. Those who had the good fortune to attend the recent meeting of the North Staffordshire Institute of Mining Engineers addressed by Dr. Idris Jones, director-general of research for the National Coal Board, were left in no doubt of the nature of the competition and of the extreme urgency of taking all necessary steps to meet such competition. So the problem facing North Staffordshire today is that we have to be prepared to meet this intensive competition now.

It is because I am absolutely convinced that the urgency to improve productivity and efficiency is so immediate that I make no excuse for referring to a subject which has been the theme of many addresses and circulars in recent weeks. A critical re-examination of *all* colliery operations in the light of the present emergency is necessary. Conditions which applied 12 months ago do not necessarily apply now. The best methods of working in 1959 may now be completely out of date. The staffing of non-productive operations on the surface or elsewhere underground may have been perfectly satisfactory two years ago, but with reduced output due to lower manpower, such staffing may well no longer be justified.

The need for concentration of workings has been stressed many times in the last few months, but I am convinced we hardly understand what it really means. I am far from satisfied that we have taken these words of wisdom sufficiently to heart. We are all far too conservative and far too ready to accept the easy way out in these matters. Too often we have thought of concentration as purely and simply a geographical matter of concentrating the output of several faces at one loading point. This is not the form of concentration which will necessarily pay the best dividends. What we have to find is the highest possible output we can obtain from one unit on the least number of shifts. We should re-examine all face layouts and where possible increase face lengths to the maximum that can be satisfactorily be worked with the equipment available and safe ventilation. For all cyclic methods of working we should review the depth of cut, increasing it to the absolute maximum consistent with good roof control. This is especially important where solid stowing is practised, as there is no doubt that manpower efficiency on solid-stowing operations is greatly improved as the width of web is increased. In this coalfield we have a reputation for adopting the practice of working under a coal roof. Few other coalfields can afford to do this. I often wonder whether we can. We should have the courage to re-examine the possibility of working cyclic mining on one shift for all operations. In an emergency this was successfully achieved at one small colliery in the Area for a short time, and the results were most encouraging. However, since then no one has had the courage or determination to follow the example.

The Price of Progress

All too often our comments on the achievements in other coalfields are: "Very good, but it could not be done in North Staffordshire." We need to recognize that mining conditions in this coalfield are certainly no more difficult than the average for Great Britain. True, we have some complications due to depth, methane emission, and dust, but to compensate for these we have the richest coalfield, judged on coal density, in England. The degree of minor faulting is by no means as severe as that of some of our neighbours. Average seam thickness

is between 4 ft. and 4 ft. 6 in.—and what could be better?

Face conditions are well above the average. We have very few water troubles. In spite of the coalfield's reputation as the home of the rearers, the average full dip of the faces now in production is certainly not as much as 1 in 5. We have a labour force with a high standard of workmanship of which we are justly proud. In other words, we have in this coalfield mining conditions which should enable us to be in the forefront in the search for new methods of working and improvement in mining technology. It is vital that we should be experimenting with new methods and improvements upon the old. Failures there are bound to be, but that should worry no one, for they are but the price of progress.

The concentration of workings within a colliery is really important, but perhaps the concentration of output at a smaller number of collieries may be even more important. The importance to the profitability of the coalfield or the planned outputs at the reconstructed collieries being achieved will be quite clear to anyone who has given thought to the annual interest and depreciation charges which must be met. Even at the planned output the interest and depreciation charges at a fully reconstructed deep colliery must inevitably be of the order of £1 per ton.

When operating at considerably less than the planned output these charges must be such a drag on the results of the colliery as to make it extremely difficult to operate profitably even at high productivity and efficiency. It is also true that once a colliery surface has been fully reconstructed there is very little difference between the manpower required to operate the colliery at the fully planned output and 50 per cent. of it. As a result, surface efficiency will naturally improve to a spectacular extent as output is increased towards full production. It is these facts which make the staffing of the major reconstruction projects of such extreme urgency today.

Colliery Closures

It is common knowledge that there are several small collieries in the Area coming to the end of their useful life. The major reconstruction projects are being developed so that they can take over the outputs of these smaller collieries, and there must be no hesitation in effecting the closures at the most opportune time. While from a social point of view this may seem a harsh doctrine, it is, however, a very necessary one if the coal industry is to flourish and remain competitive. We certainly cannot afford a delay, for instance, of six months in achieving the best possible results from the newly reconstructed collieries. I do not underestimate the social consequences of closing a colliery, but I believe that if we face up to the necessity of these closures and make the necessary preparations early enough, hardship can be limited to a minimum. In any event, any hardships incurred will be very much less than the position which will inevitably arise if the closures are not effected in time and the coalfield loses its ability to compete for its share of the fuel requirements of the country as a whole.

Those engaged in the mining industry are mostly conservative by nature whatever their politics, and there are always strong objections to men being moved from one colliery to another. In spite of this, the move from an old and relatively badly equipped colliery to a modern one is really to everyone's benefit in the long run. Working conditions and general facilities are better and overall productivity and efficiency are higher.

Fewer Managers

The concentration of output in this coalfield at a smaller number of collieries must inevitably have an effect on the members of this association. It will mean that there will be fewer colliery managers' jobs available—but there will also be considerable benefits to be obtained. There are already a number of appointments of the class of agent/manager in the area, and there must be more in the future. This in itself must improve the prospects for some members. Additionally, it is essential that there should be deputy or assistant managers appointed at each of the larger collieries. This will provide positions to be filled by the more junior members of the association where such positions have not existed in the past. I submit that colliery managers must accept the forthcoming closures in this coalfield as a matter of real necessity. The association should regard them as means of ensuring that North Staffordshire continues to supply a fair share of the country's output.

In this drive to increase the competitive power of our coalfield the North Staffs Branch of the NACM has a very important part to play. One of the most important functions of the National Association of Colliery Managers, and likewise of the Institution of Mining Engineers and the Association of Mining Electrical and Mechanical Engineers, is the dissemination of technical knowledge. The proceedings of meetings of these bodies have been rightly recognized as the up-to-date text-books of our industry. To these the NCB's information bulletins have more recently been added. The meetings of these technical associations provide an extraordinarily valuable opportunity for discussion of the most recent developments in the industry, and it is of real importance that the meetings should be well attended. The value of a technical paper read to one of these bodies may be very great indeed. The value of a full discussion on such a paper, when the results and conclusions described by the author are subjected to analysis and criticism of a number of other engineers, can be far greater. May I here make a plea for improved attendance at the meetings of our associations. We have had many valuable papers read in recent years and a great deal can always be learnt from the successes and failures of other people, and more still can be learnt from comparison of each other's experiences. We all need the maximum help we can obtain from each other if we are to come out of the present struggle satisfactorily. I believe the importance of our meetings,

and those of our kindred associations, cannot be over-estimated in the present emergency.

Looking back over the last few years there have been considerable advances made in this coalfield of which we can rightly be proud. Although in the field of mechanization we have not as yet made the spectacular progress of some of our neighbours, there are shining examples of what can be achieved. We can show efficiencies with Meco-Moore cutter loaders which bear comparison with most installations in the country. We have plough installations which, to say the least, are extremely satisfactory. This coalfield has led the way in many aspects of the extremely important technique of methane drainage.

During recent years a fund of specialized knowledge has been built up in the coalfield on the subject of mining subsidence. This knowledge is the result of 10 years' patient research and has already proved of substantial importance to the country as a whole. Since Vesting Date we have sunk the two deepest shafts in the country, and although a good deal of publicity has been given to the achievements of our neighbours in the speed of shaft sinking, when the new Wolstanton shaft is commissioned this summer we shall have completed a programme which will stand comparison with any similar project in the country. At Hem Heath Colliery we have what is virtually a new colliery surface layout, and on purely architectural grounds alone it is something of which we can be justly proud.

The North Staffs coalfield should be able to show a spectacular improvement in productivity and efficiency in the next year or two. If this is achieved, although the spectacular increase of output to 9,000,000 tons per annum by 1970 is not now likely to be required, the coalfield may be expected to have to maintain an annual output at least equivalent to the average over the past 10 years—that is, some 6,000,000 tons. There is scope within the coalfield for a further three major projects. At these three collieries a considerable amount of reconstruction work will still be required even for the maintenance of the lower level of output, and any increase of Area output will have to be met from these collieries. The volume of such reconstruction work will therefore inevitably depend upon the results achieved in the immediate future in the Area as a whole.

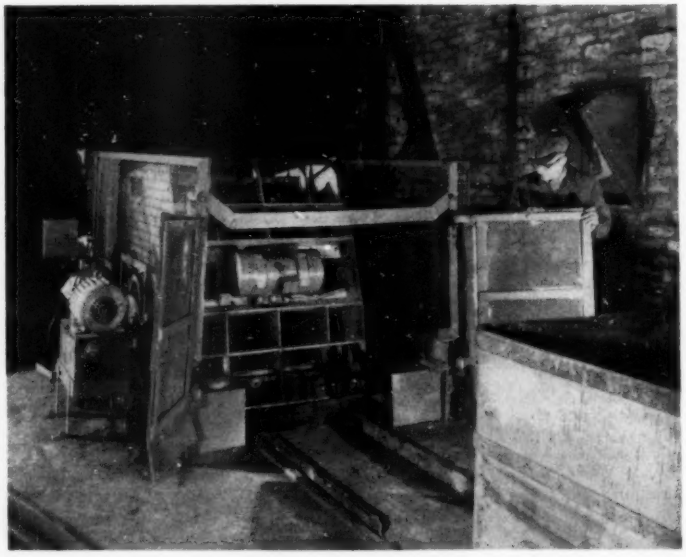
In conclusion, I should like to make it very clear that I believe the future of this coalfield can be very bright indeed. Perhaps I should emphasize that the opinions I have expressed are my own and not necessarily those of the National Coal Board. I am certain that if everyone within the mining industry in this coalfield is prepared to accept the challenge to make this coalfield competitive with any other in the country, it will be found that the potentialities are there to be exploited. If we are successful, then we in this coalfield will be playing our part in retaining a healthy coal-mining industry which is of such great importance to the security and wellbeing of the nation as a whole.

VIBRATING TIPPLER

THIS vibrating tippler, using an English Electric vibrator motor, is one of three recently installed in the Northern (N&C) Division of the National Coal Board.

It is used for removing the consolidated coal dust from 10-cwt. tubs. Tubs can be handled at the rate of one a minute. The turnover unit is hydraulically operated and the 1½-h.p. vibrator motor operates at 1,500 r.p.m.

The complete tippler has been developed by Byron & Jones Engineering, Limited, Hampton Hill (Middx).



AN INITIAL REQUEST of a general character has, it is reported, been submitted to the High Authority of the European Coal and Steel Community by a consortium of French, Belgian, and Luxembourg steelworks for authority to construct a large integrated steelworks near Ghent.

This talk was given at a joint meeting of the North Wales Metallurgical Society and the North Wales Section of the Royal Institute of Chemistry, held on March 8, at the Flintshire Technical College, Connah's Quay. The speaker outlined the growth of the physical chemist's role in steelmaking in the last 25 years. He expressed in simple terms the physical chemist's interpretation of steelmaking reactions and referred to many topical examples of interesting steelmaking phenomena.

PRESENT POSITION OF PHYSICAL CHEMISTRY IN STEELMAKING

by

SIR CHARLES F. GOODEVE, F.R.S.

Director, British Iron and Steel Research Association

ONE of the useful functions that physical chemistry can perform in any industry is that of explaining in quantitative terms how the elements and compounds in a chemical process react to produce the end-product. The first step towards this is the correlation and consolidation of the existing knowledge. Gaps in the pattern of knowledge will invariably become apparent and research work to close these gaps can be undertaken.

It is only about 25 years since the physical chemist began to give serious attention to steelmaking processes. Since then sound explanations of the various chemical reactions encountered in steelmaking have been sought and information correlated to provide a comprehensive theory of steelmaking. This theory is still incomplete in detail. By piecing together seemingly random bits of information the physical chemist has made an impact on our understanding of the steelmaking process, but as yet there is little he can claim to have done directly in the development of new processes.

However, it is apparent that the much more complete and precise knowledge of the physical chemistry of steelmaking of today will be the means of at least two important developments in the steel industry. On the one hand, there are the great rewards that await a process for the selective reduction of mixtures of metallic ores: a knowledge of the physical-chemical constants of elements involved is essential for the development of such processes. On the other hand—and perhaps of greater importance and urgency—there is the application of automation to steelmaking processes. Here again, the precise data on the course of steelmaking reactions which are necessary for the development of control systems have been provided by the physical chemist.

Behaviour of Carbon

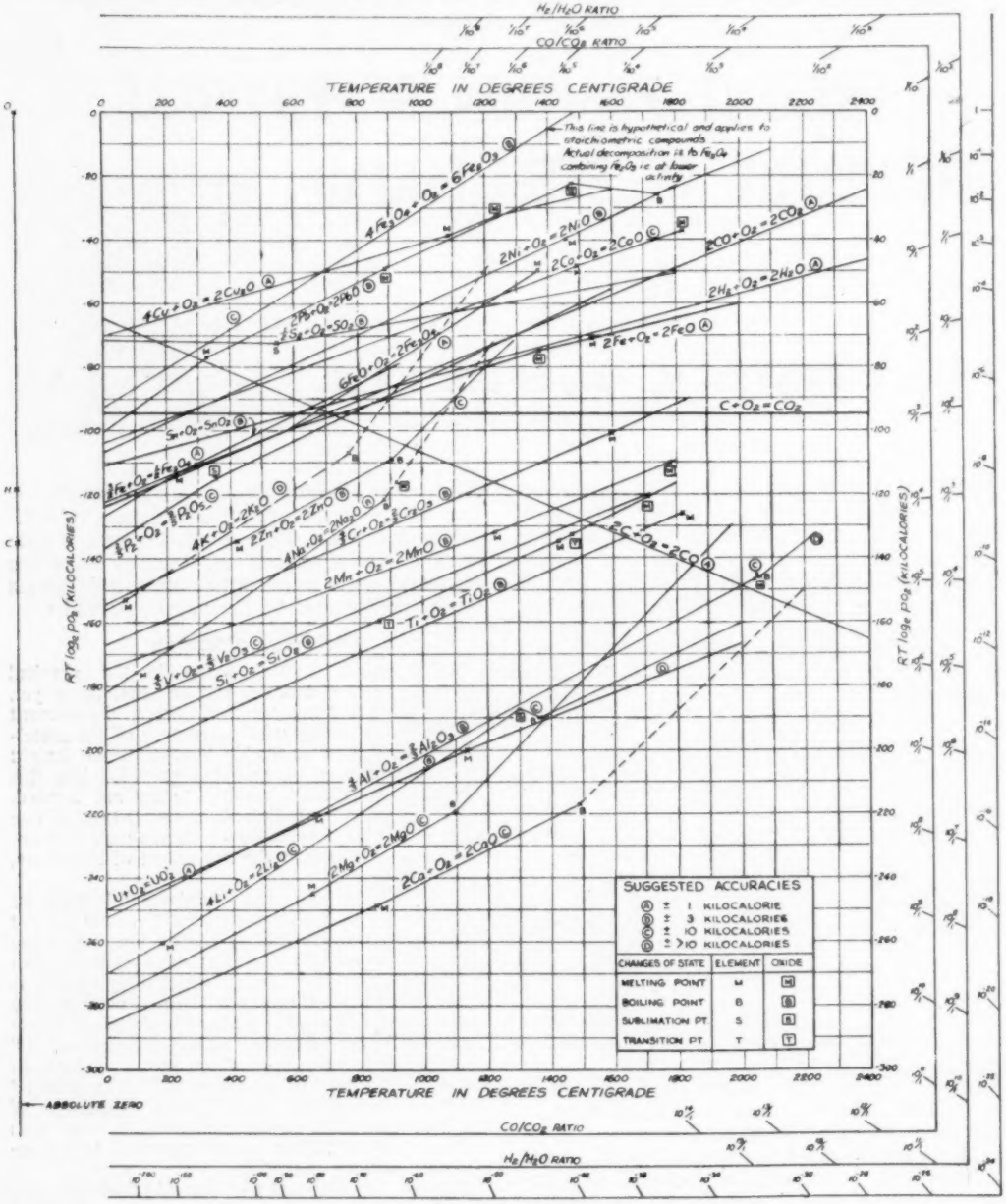
The most fascinating study in the physical chemistry of steelmaking, and one that is, as yet, incomplete, is the behaviour of carbon, the element which dominates the whole structure of the metallurgy of iron and steel. To appreciate the insight which the physical chemist has provided into this subject some thermodynamic terms are needed. These terms are not difficult to understand if one realizes that they correspond to terms used in more familiar fields, such as the movement of electricity, water, or gases.

The first of the two fundamental laws of thermodynamics which states that "matter cannot be created or destroyed," is readily understood by anyone. The second law, "heat will only flow down a 'temperature hill' unless mechanical work is expended to force it upwards" can be quite readily understood if thought of in the familiar terms "water only runs downhill unless pumped uphill," or "electricity only flows from states of high to states of low voltage or potential." The parallel statement underlying the physical chemistry of steelmaking is that oxygen can only by itself pass from a state of higher oxygen potential to a state of lower oxygen potential.

One of the first tasks of the physical chemists was to determine the relation between oxygen potential and the process of oxidation of various

elements concerned in the metallurgy of iron and steel. This was done and the data have been represented in a useful diagrammatic form showing, in relation to temperature, the oxygen potential for the formation of oxides of various elements. Fig. 1 is such a diagram for practically all the reactions likely to be met with in steelmaking, and Fig. 2 shows a selection of those curves which concern the main steelmaking reactions.

The ordinates in these diagrams represent the


TEMPERATURE IN DEGREES CENTIGRADE
CO/CO2 RATIO
H2/H2O RATIO
RT log10 pO2 (KILOCALORIES)
ABSOLUTE ZERO
This line is hypothetical and applies to stoichiometric compounds
Actual decomposition is to Pb Fe3O4 containing Fe2O3 i.e. at lower activity
SUGGESTED ACCURACIES
A ± 1 KILOCALORIE
B ± 3 KILOCALORIES
C ± 10 KILOCALORIES
D ± >10 KILOCALORIES
CHANGES OF STATE
ELEMENT
OXIDE
MELTING POINT
BOILING POINT
SUBLIMATION PT.
TRANSITION PT.
C + O2 = CO2
2CO + O2 = 2CO2
2H2 + O2 = 2H2O
2Fe + O2 = 2FeO
2Ni + O2 = 2NiO
2Co + O2 = 2CoO
4Fe3O4 + O2 = 6Fe2O3
2C + O2 = 2CO
2Mn + O2 = 2MnO
Ti + O2 = TiO2
Si + O2 = SiO2
2Mg + O2 = 2MgO
2Ca + O2 = 2CaO

Oxygen Partial Pressure

FIG. 1.—OXYGEN POTENTIAL DIAGRAM.

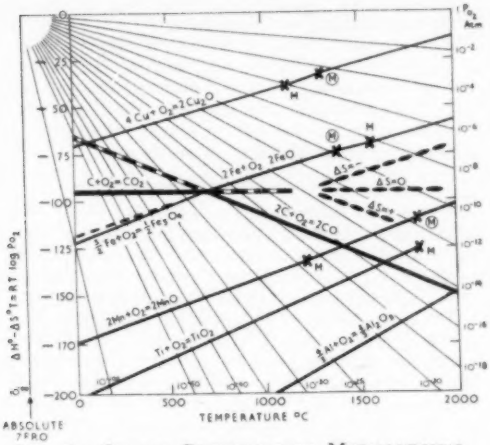


FIG. 2.—OXYGEN POTENTIALS IN METALLURGICAL PROCESSES.

oxygen potential of oxides (actually a logarithmic function of the pressure of oxygen in equilibrium with the oxide). This oxygen potential (or potentiality to give up oxygen) is represented by a negative value because the pressures of oxygen are always below unity. The larger this negative value the lower the oxygen potential. For most elements the lines slope upward from left to right, that is, the oxygen potential is greater at the higher temperatures, the oxides being less stable thermodynamically as the temperature is increased. We will see in a moment that this is because reactions prefer the state of higher disorder at higher temperatures.

Interpretation of this type of diagram shows, for given conditions of temperature and pressure, not only which reaction of a number of possible reactions is most likely to occur, but also a quantitative measure of the energy change involved in the reaction. For example, the line for the oxidation of Al to form Al_2O_3 lies well below the line for oxidation of Fe to form FeO; at 1,000 deg. C. the oxygen potential of Al_2O_3 is -200 Kcals and that of FeO is -85 Kcals, *i.e.*, 115 Kcals higher. Hence oxygen can be given up more readily by FeO than Al_2O_3. In other words, the attraction for oxygen to combine with aluminium is much greater (the oxidizing potential of Al_2O_3 is much lower) than for it to combine with iron.

This is confirmed rather spectacularly by the Thermit process in which iron oxide is mixed with aluminium powder and a reaction initiated by a burning magnesium ribbon. The aluminium quickly takes the oxygen from the iron oxide to form alumina and leave free iron. In the reaction much heat is evolved and the iron becomes liquid.

As a further example, the lines for oxidation of Mn, Fe, and Cu can be taken. The Mn line, sloping upwards from about -175 has a lower oxygen potential than iron, whereas the copper line sloping upwards from -70 has a higher oxygen potential. This explains why manganese can be oxidized from liquid steel and copper cannot.

Another feature to be noted about this type of diagram is that nearly all the lines slope upwards from left to right and are roughly parallel. The notable exception are the lines for the reaction $2C+O_2 \rightarrow 2CO$, which slopes the opposite way, and for the reaction $C+O_2 \rightarrow CO_2$, which has no slope. These slope characteristics are explained by the changes in entropies of the systems as a result of the reactions.

All substances have a characteristic entropy value and reactions bring about characteristic entropy changes. The entropy change is a measure of the change in degree of disorder of the system. Solids have a high degree of order and gases a low degree of order (or high degree of disorder). For most of the reactions in this diagram (Fig. 2), oxidation is characterized by a solid combining with a gas to form a solid (*i.e.*, highly ordered) product,

e.g., $4/3\ Al + O_2 \rightarrow 2/3\ Al_2O_3$

Solid: order. Gas: disorder. Solid: order.

This is described as a change from a state of order plus disorder to a state of order. In fact, if the line slopes upward we can be sure it represents a change of this type.

The line representing $C+O_2 \rightarrow CO_2$ is horizontal. In this reaction the volume of gas stays unchanged. This is explained in terms of entropy as a change from a state of order-disorder (equivalent to disorder) to a state of disorder, which gives no real change in the system. Therefore the line does not slope up or down.

Now consider the line for $2C+O_2 \rightarrow 2CO$. Here we start with an order-disorder (equivalent to disorder) state changing to a state of disorder which occupies twice the volume (we start with one molecule of oxygen and finish with two molecules of carbon monoxide). This represents a change to a greater state of disorder—a change in entropy represented by a line sloping downwards.

The explanation of the upward slope of line $2CO+O_2 \rightarrow 2CO_2$ is explained as follows. The system passes from a disordered state occupying three molecular volumes to a disordered state occupying two molecular volumes, that is, the entropy change is to a less disordered state.

With regard to the line for the reaction $2C+O_2 \rightarrow 2CO$, its downward slope from left to right indicates that its driving force increases as the temperature increases. In other words, there is always some temperature at which an oxide can be reduced by carbon.

Oxidation of phosphorus in iron is of particular interest to steelmakers. In the diagram the lines for $2/5\ P_2+O_2 \rightarrow 2/5P_2O_5$ and $2Fe+O_2 \rightarrow 2FeO$ lie very close together. The diagram, however, relates to pure compounds and when there are a number of elements present in solution, as, for example, in steelmaking, the activities of the various elements are lowered. In basic steelmaking the lowered activity of P hinders its removal. But by lowering

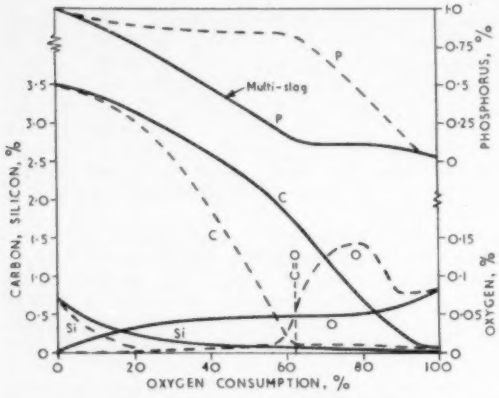


FIG. 3.—COMPARISON OF LD (SOLID LINE) AND BESSEMER (BROKEN LINE) PROCESSES.

the activity of P_2O_5 (using a basic slag) phosphorus removal can be obtained.

In general, lowering the activity (or pressure) of substances in the left-hand side of the reaction equations in the diagrams reduces the driving force for the reaction as written (and *vice versa*); lowering the activity or pressure of substances on the right-hand side increases the driving force (and *vice versa*).

Bottom-blown and Top-blown Converter Processes

The behaviour of carbon in ferrous metallurgy which has already been noted as of unusual interest presents some unexpected phenomena in the refining of iron. A study of the courses of refining iron during the bottom-blown Bessemer process and the LD process depicted in Fig. 3 (comparison of the Bessemer and LD process in relation to oxygen consumption), reveals a phenomenon of special interest to the physical chemist.

The action of C and O in the metal is known to form carbon monoxide and the equilibrium position is such that the product of C and O equals 0.0025 times the partial pressure of CO. Thus, with 0.10 per cent. C. and CO at 1 atm. pressure there would be 0.025 per cent. O, with 0.05 per cent. C, 0.05 per cent. O, and so on. Examination of the top-blowing process generally shows that the product of C and O is often very much higher than this equilibrium value.

After considerable investigation the physical chemist can now explain this phenomenon. It has been found that if a liquid slag of calcium ferrite $(CaO)_nFe_2O_3$ (which is present in top blowing) is poured on to a melt of iron containing carbon and phosphorus this unusually high C × O product results. This is not a true equilibrium relationship and its existence is explained as follows.

Atoms of phosphorus can readily transfer to the vacancies in the calcium ferrite of the slag, lose electrons, and be held in the slag. Such a transfer can be extremely fast and is accompanied by transfer of oxygen into the steel. On the other hand, the reaction of C with O to form CO requires the grouping together of thousands of CO molecules before the nucleus of a bubble of CO can form and escape. In other words, because the kinetics of the carbon and oxygen reaction is very slow and that of phosphorus transfer very fast, there is a build-up of O and this gives a high C×O quasi-equilibrium product relationship.

The Sulphur Pump

A physico-chemical phenomenon which Prof. Richardson has called the "sulphur pump" is of more than academic interest. By lowering the oxygen potential in the slag where it touches the metal, sulphur can be made to pass from the steel to the slag. If the slag is now treated with an oxidizing gas it loses sulphur to the gas. In other words, by blowing pure oxygen on to the slag the sulphur it contains can be burnt out into the gas phase even though the sulphur potential in the gas is higher than in the metal. We have really pulled the sulphur uphill by tying it to oxygen running downhill. It is this kind of reaction which accounts for the more effective desulphurization which occurs in the oxygen jetting process.

Rimming Steel

Rimming steel might be simply defined as a process of ingot making in which one aims for very low total carbon and oxygen contents with particularly low contents in the outer layer of the ingot. This is achieved if steel of suitable C and O contents is used and if the C and O can effervesce out of the steel as CO during solidification. This effervescence occurs because the C×O solubility product is much lower in the solid than in the liquid steel.

If one considers the cooling of the steel at the mould wall when the freezing temperature is reached (at about 1,532 deg. C.) almost pure iron is thrown out of solution. Further, if the steel contains oxygen in sufficient amount the reaction $C + O \rightarrow CO$ takes place and eventually bubbles of CO are evolved, that is, the C and O contents of the steel are lowered. With vigorous effer-

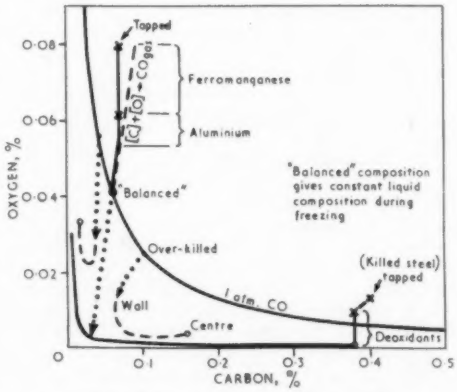


FIG. 4.—C-O RELATIONSHIP IN RIMMING.

vescence the liquid in the mould is kept stirred, keeping the liquid that is in contact with the advancing solid relatively pure.

The carbon-oxygen relationship during rimming is represented in Fig. 4. For the best rimming action the aim is to achieve the composition marked "balanced" as the steel is poured. Carbon contents above or below this "balanced" composition both result in a less vigorous boiling action and in the ingot having the wall-to-centre C and O distribution shown, respectively, by the right and left hand arrowed interrupted lines.

With a high carbon composition, say, 0.4 per cent. carbon, the equilibrium amount of oxygen in the steel is negligible and very little carbon monoxide can be formed during solidification. Killed steels are in this range and have their dissolved oxygen content further reduced by addition of deoxidants.

This simplified theoretical approach might suggest that rimming steel manufacture is easy. However, it is far from easy to make the steel to the "balanced" composition and, furthermore, the rimming action is found to be influenced by other factors.

A puzzling effect reported recently was that if the air over the top surface of a rimming ingot is replaced by nitrogen the rimming action stops immediately, but starts again when air is readmitted. As yet no satisfactory explanation of this phenomenon has been given. Obviously the physical chemist still has something to learn regarding the carbon and oxygen reaction and about rimming steel.

Although there are many aspects of steelmaking, for example, foaming of steelmaking slags and the fume evolution during oxygen blowing processes, which are not yet fully understood the examples given in the foregoing show how some steelmaking phenomena are now being explained satisfactorily in terms of physical chemistry.

The concept of entropy is most useful in considering steelmaking physical chemistry, but it is a great pity that it was originally defined as a measure of the degree of disorder. This definition gives the entropy change indicating driving force a positive sign in contrast to negative signs of other functions. The behaviour of carbon in the metallurgy of iron and steel can be explained best by its low entropy, compared with that of its high-temperature oxide, CO. This fortunate entropy effect has made large steel industries possible.

To conclude, perhaps the most appropriate quotation is the following:—

"Were there maximum entropy and complete chaos the world of phenomena would be much the poorer, but were there the rigid constraint which the energy factor alone would impose, things would be as bad or worse. Nobody who has thought about science can fail to admire the art with which Nature interweaves her two great themes. When molecular chaos is set in order it is only at a price, but price and value are astutely bargained. So it must be in human affairs"—SIR CYRIL HINSHELWOOD.

Sir Charles Goodeve, answering numerous questions in the discussion which followed, dealt with differences between the chemistry of the open-hearth and top-blowing processes, showing that they were considerable. Dealing with deoxidizing he agreed that at high temperatures the deoxidizing effect of manganese was not as high as that of some other agents.

Several speakers pointed out that partial closing of a mould top slowed down the rimming action of an ingot and suggested that the effect might have a similar explanation to the effect reported about a nitrogen atmosphere. Sir Charles replied that it was hoped that experiments with other inert gases such as argon would help towards an explanation of these phenomena.

To a question on the progress on the BISRA project "flame smelting," he said the process operated at temperatures of 1,600 to 1,700 deg. C. Work to find the conditions giving maximum surface between solids and gases in the process had made good progress, and the reaction between the powdered coal, ore, and oxygen was extremely fast. The pilot plant had been able to produce a few tons of crude steel at rates of about 1 ton/hr. For the process to be economic a high degree of pre-reduction of the ore would have to be obtained and this was being studied.

On direct reduction in general, he thought that more of the many direct processes for iron would come into commercial use during the next few years. The plants would probably be sited at the ore mines for making a crude iron for further processing, either in blast furnaces or steel furnaces. The use of oil held out good possibilities for economic reduction of iron ores and the electric smelting process was attractive in some countries. He envisaged that in the future some iron ore from Labrador would be reduced and exported in pellet form rather than as a bulky ore.

CORROSION PROBLEMS IN ELECTRICAL INDUSTRY

FOR the first time, the Corrosion Summer School (September 25 to 28), organized by the metallurgy department of Battersea College of Technology with the co-operation of the Corrosion Group of the Society of Chemical Industry, will be concerned with the particular aspects of corrosion met in one industry, the electrical power industry. Starting with boiler feedwater, corrosion and its prevention are surveyed as they affect each stage of generation, concluding with transmission and distribution.

It is hoped to visit the Central Electricity Research Laboratories at Leatherhead on the final day.

Enrolment forms and full details may be obtained from the Secretary, Metallurgy Courses, Battersea College of Technology, London, S.W.11. Fee for the course is £10.

New Sinter Cooler

A NEW sinter cooler—first of its type—has recently gone into operation at the New York ore division of the Jones & Laughlin Steel Corporation (Fig. 1). The new equipment, which has been installed on the division's sinter plant, differs from the conventional-type rotating cooler in that it is stationary, and the sinter is cooled by blasts of air as it works down through a vertical shaft (Fig. 2).

FIG. 1.—GENERAL VIEW OF THE COOLER.

The new type of cooler gives the sinter a longer exposure for cooling. Sinter is cooled in the new equipment for as long as 1½ hr. as compared with 15 to 20 min. in a circular cooler. Sinter from the new cooler can be loaded directly in railway wagons.

The cooler, which has a rated capacity of 3,800 gross tons of product per day, was designed and installed by the Dravo Corporation, of Neville Island, Pennsylvania. The vertical shaft of the cooler is approximately 100 ft. high, and has a 44-ft. dia. at its widest point. It is shaped much like a blast furnace.

The installation also includes new breaking and screening plants for the division's two 6-ft. wide sinter machines.

In the operation of the new equipment, fused sinter leaves the two machines and is discharged onto an apron feeder, which carries it to a new Dravo-Lurgi breaker. The material then passes through a new Dravo-Schenck vibrating screen which removes the hot fines or small particles. A pan conveyor then delivers the screened sinter to the cooler. At the discharge end of the cooler, a combination feeder-screen removes the cold fines and delivers the cooled sinter to railroad cars.

Most of the division's 1,000,000-ton annual rated output of magnetite ore and its annual output of 740,000 gross tons of martite ore are sintered at the division's sinter plant before being shipped to Jones & Laughlin's three steelmaking divisions at Pittsburgh, Aliquippa, and Cleveland. Shipments from

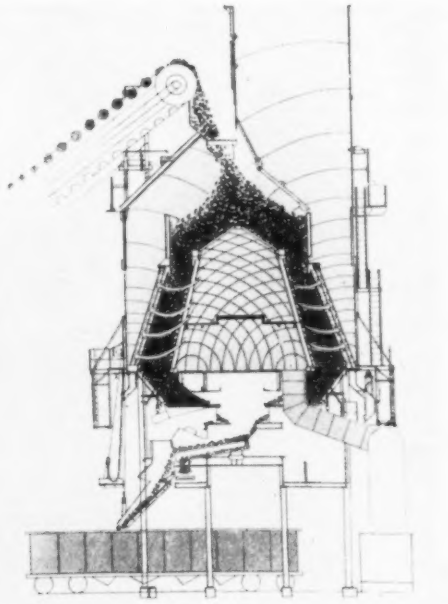


FIG. 2.—SCHEMATIC DRAWING OF STATIONARY CROSS-BLOWN SINTER COOLER.

the division are entirely by rail. Both mining and shipping are conducted on a year-round basis.

Tasmanian Ore and Coal

A syndicate headed by Mr. E. R. Hudson, of Sydney, is to form a £1,000,000 company to investigate iron-ore and coal deposits in Tasmania. Exploration licences have been granted to Mr. Hudson by the Tasmanian Government. The coal deposits are on the east coast, and the iron-ore deposits are at Savage river, on the west coast. The company will carry out a geological survey, diamond drilling, development work, and technical investigations which will include the economics of beneficiation, direct reduction, and electric smelting.

INSTRUMENTATION WORK *of the Mining Research Establishment*

by A. E. BENNETT, B.Sc.(Hons.). M.I.E.E.*

Increasing use is being made by the coal-mining industry of modern measuring techniques and they may well have a major part to play in improving the economy of the industry. In this paper, presented to the South Midland Branch of the National Association of Colliery Managers on March 6, 1961, the author reviews the progress that has been made by the Mining Research Establishment of the National Coal Board in providing instruments and instrumentation schemes specifically designed for underground use.

PRIME purpose of the Mining Research Establishment of the National Coal Board is to carry out work aimed at increasing the efficiency of coal production while maintaining a high level of safety. To this end the work embraces such projects as a study of the basic factors in coal-winning processes, *i.e.*, the action of cutting tools, instrumentation of power-loading machines and examination of their performance underground; investigation of the behaviour of strata on powered support faces; investigation of remote control of face supports and self-advancing roadhead supports, and overall considerations of the safety of electrical equipment. Environmental research is directed to improving dust suppression, detection and control of methane emission, and control of working conditions at extreme depths and humidity. By establishing improved material specifications for such items as drill bits, roof supports, belting, etc., considerable savings can be effected by the purchasing and stores department of the NCB.

A recurrent need in all these fields of investigation both in the laboratory and underground is for more measurements and the instruments with which to make them. The range of commercially available measuring instruments continues to grow at an ever-increasing rate and a wide selection is available for use in the laboratory. Nevertheless, from time to time as research has proceeded, new measuring techniques, specific to its problems, have been evolved by the various groups of the establishment to facilitate laboratory investigations.

The position with regard to instruments that can be used underground is, however, quite different. The range that was available when the establishment was formed was almost entirely restricted to a small number connected with the safety of the pit, such as the gas-testing lamp, thermal precipitators for the measurement of dust, insulation testers, anemometers, and general survey instruments. As a result, the early years of the MRE were concentrated upon the development of a range of instruments which would facilitate the taking of underground measurements particularly in the environmental field and that of strata control. Subsequently, attention has been directed to the more difficult problem of devising means of assessing the performance of coal-winning machines as they are actually performing the task for which they were designed.

While the provision of laboratory instruments presents many problems which are of general interest, it is proposed in this paper to review the progress that has been made in providing instruments and instrumentation schemes specifically designed for underground use, where the problems of robustness and electrical safety with regard to ignition hazards are most acute.

Environmental Control

The establishment of satisfactory underground working conditions is dependent upon a knowledge of gas emission, airborne dust, and temperature and humidity. These factors have always been present, but are becoming accentuated by having to work deeper seams and the increasing use of mechanized winning with its resulting rapid rates of advance, higher production of fines, and high rates of emission of methane.

The measurement of airborne dust was the first aspect studied by MRE to result in the introduction of a new measuring instrument. This is the

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FIG. 1.—MODIFIED LONG-RUNNING DUST SAMPLER, TYPE 112.

long-running dust sampler type 101[1] which has been designed to measure continuously throughout a shift the amount of airborne dust present. Commercially built models have been in use for four and a half years and trials, in conjunction with the Inspectorate, will shortly be completed which it is hoped will result in this instrument being accepted as the "approved" sampling unit. Recent work has been directed to the reduction in size and weight of the unit by replacing the original clockwork driven model by a much smaller electrically driven unit, type 112, which is shown in Fig. 1.

Investigations to provide a new range of instruments for the control of methane are now nearing a first stage of completion. The first target has been to devise a continuous monitoring and recording unit which will run unattended for a period of at least a week. The instrument that has been evolved [2, 3] is shown in Figs. 2 and 3; it is basically similar to the Davy lamp in that the methane present in the mine atmosphere is burnt in a flame, but instead of having to estimate visually the height of the blue cone, a ring of thermocouples measures the temperature above the flame and the resulting signal is displayed on a recording milli-ameter. Production of these units by the Sigma Instrument Company, Limited, Letchworth (Herts), has already started. A lightweight, single-shift, variant intended for use by deputies, etc., in which the methane concentration

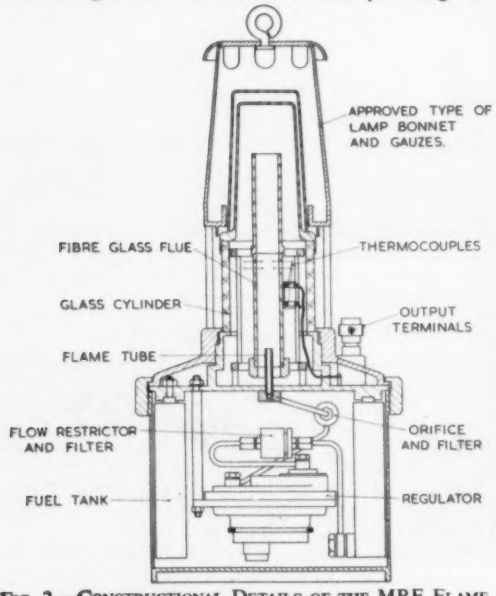

FIG. 2.—CONSTRUCTIONAL DETAILS OF THE MRE FLAME METHANOMETER, TYPE 208.

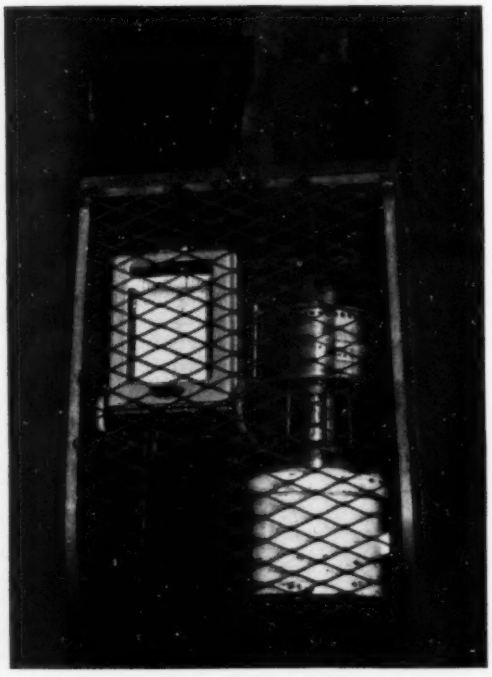

FIG. 3.—THE MRE FLAME METHANOMETER, TYPE 208, INSTALLED IN A MINE ROADWAY.

is displayed on a meter, is now ready for underground trials.

A high concentration methanometer instrument has been designed to measure the purity of the gas flowing in methane drainage systems. An installation which indicates and records on the surface the concentration measured by a number of these instruments at various points on the underground pipe range has been working at Haig Colliery for about two years. This principle is now being extended to control the drainage from behind a stopping at Avon Colliery, to maintain constant purity in the pipe range as the barometric pressure varies, and simultaneously prevent egress of gas through the packs into the roadway.

To assist in measuring the quantity of air flowing at any point in a roadway a simple instrument has been designed which can be used to give an accurate scale drawing of the perimeter of the cross section of any shape or size of airway likely to be encountered.[4] The apparatus, known as a Profilograph, is shown in use in Fig. 4. It consists essentially of a pivoted arm mounted on a chart board and arranged to align itself with the direction of a cord extending to successive points on the perimeter of the airway. A marking pointer linked with the cord moves to a radial position proportional to the radial length of the extended cord. A slight pressure on the instrument causes the marking point to make a small dot on the chart, and thus by moving the cord from point to point the perimeter profile is plotted on a reduced scale.

Strata Control

In order to obtain a better knowledge of the behaviour of strata on a face as coal is extracted, and in particular to examine in detail the effect of the introduction of powered supports, a range of strata control instruments has been designed.

These include a 50-ton load cell which has the interesting feature of being independent of the manner in which the load is applied, *i.e.*, distributed, point, or strip loading does not affect the accuracy of the cell. This is an essential requirement in underground investigations as it is not always possible to control the manner in which a cell is loaded when it is placed between a prop and a bar, or bar and roof, etc. To measure the strain in the roof or on the face of the coal itself, a bolted-strip strain gauge extensometer[5] has been devised which is attached to the exposed roof or face by means of Rawlbolts. The strain is deduced by measuring the minute extensions or contractions that occur as the load or stress varies, and to achieve this, sensitive indicating units have had to be constructed. These include transistor-operated models, which are intrinsically safe and consequently light in weight and portable. To facilitate the continuous recording of these strata measuring units a multi-channel recorder has been developed. This is based on a commercial design which is unsafe (electrically) for use underground, and has had to be considerably modified in order to make it intrinsically safe.

As the measurement of relative movement between the roof and floor is of considerable interest in strata control investigations, a roof movement meter, called the Romometer,[6] has been devised for this purpose. This instrument also enables a measurement to be made of the convergence that is occurring.

Machine Instrumentation

To improve the design and application of power-loading machines on mechanized faces a more detailed knowledge of the performance of the machine is required under operational conditions as it is actually cutting coal. The items of interest include a knowledge of the force required to haul the machine along the face and the drag in the trailing chain or rope, the actual cutting force applied to the coal by the picks or blades (and sometimes this must be resolved into three components), stresses set up within the machine, *e.g.*, torques in shafts, temperatures and flow rates of cooling water, compressed-air pressure and flow, and the electrical power used in terms of watts, volts, and amps. In addition, it is often desirable to know the pressure variations that occur in the conveyor-pushing rams as the machine traverses the face.

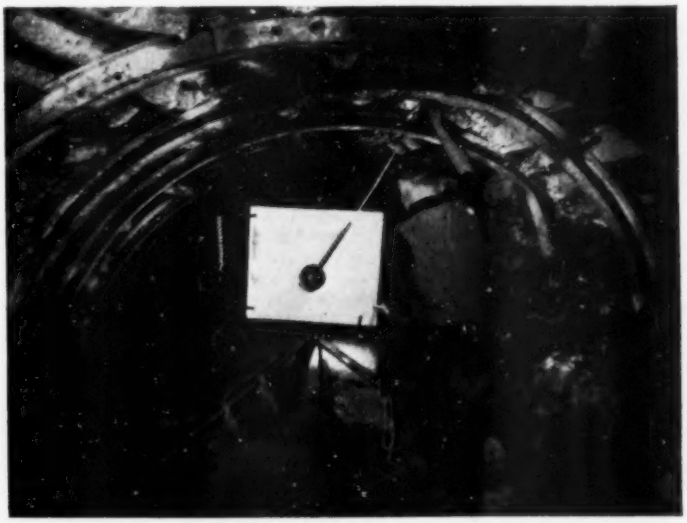

FIG. 4.—PROFILOGRAPH BEING USED TO GIVE AN ACCURATE SCALE DRAWING OF THE PERIMETER OF THE CROSS-SECTION OF A ROADWAY.

The initial attempts of MRE in this respect were in connection with an experimental percussive plough installation at "A" Winning Colliery, East Midlands Division; subsequently two further major projects have been undertaken. The first is associated with the headquarters experimental face at Donisthorpe Colliery, where instrumentation facilities have been in more or less continuous use with various kinds of machines for two and a half years.

The basic measuring techniques used are fairly conventional. Forces, torques, and strains are converted into signals by means of electric resistance strain gauges. These are fixed to the surface of the component part by means of a special cement and wired in the form of a Wheatstone bridge. As the member deforms under load the value of the resistance strain gauge is changed and an out-of-balance signal set up in the bridge. This is then amplified and recorded on a multi-channel high-speed galvanometer recorder situated in a gate road, and connected to the measuring element or transducer in the machine by means of a multi-core trailing cable.

To withstand the severe conditions that exist underground and comply with the requirements of electrical safety, almost every item has had to be specially designed or modified. The recorder presented many completely new problems particularly with regard to the torque required to drive the recording film which has to move at speeds up to 2 in./sec. Initially a compressed-air motor was used, but it has now been found possible to use an assembly of four miniature 1-W intrinsically safe electric motors. Facilities are provided at the recording station whereby various calibration signals can be inserted on the recording film and a continuous display given of a selected number of parameters.

The measurement of electric power is of particular interest as it is thought that it can find wide use in the industry.[7] Voltage and current transformers are used to obtain intrinsically safe proportional signals which can be fed directly into the recorder. A specially adapted wattmeter provides a similar signal for power consumption. These items are mounted in a flameproof enclosure which is inserted in the outgoing mains cable from a standard gate-end box. A conventional multi-core instrument-type cable is used to connect this special flameproof unit to the recording equipment.

The second major machine instrumentation project is associated with the study of the performance of fast ploughs. It was felt that the most useful results could be obtained from measurements made with a standard plough on a normal production face, and that the parameters of vital interest would be the haulage force, the effective forces acting on the plough head, the conveyor pusher ram forces, and the electrical power consumed.

Special transducers were designed to measure the haulage force and to resolve into three orthogonal components the force acting on the cutting head. These are fitted to a standard Lobbehobel which is substituted for the normal production model whenever measurements are to be taken. The transducers are connected to the recording station by means of a thin instrument cable which is reeled in and out automatically as the plough moves up and down the face.[8] It should be noted that, apart from the time incurred in changing over from the normal to the instrumented plough, there is no disruption of the standard production procedure.

So far, experiments have only been conducted at Merthyr Vale and Penrikyber collieries in relatively soft coals, but trials are shortly to commence in the harder "woodier" coal that exists on the experimental face at Donisthorpe. The results of these initial trials have been reported in a paper given to the South Wales Institute of Engineers[9].

During these trials considerable experience has been gained in both the electrical and mechanical design of sensitive measuring units suitable for use under the arduous conditions that exist at and on a face. The mechanical design of the existing Lobbehobel imposes severe limitations on the experiments that can be undertaken since the distribution and types of blades on the head cannot easily be varied. To overcome this difficulty a versatile plough head which can be fitted to a normal plough base has been designed. Instrumentation is being fitted which will enable forces to be measured on individual blades of varying shape and size, so that the combined cutting effect can be analysed in detail.

Loudspeaking Face Telephones

An interesting project that evolved from the original work done at "A" Winning Colliery is the MRE loudspeaking face telephone system. This is, in effect, an intrinsically safe public address system which offers marked improvement in face communications. Up to 20 individual units, each containing a telephone handset and speaker, can be coupled together along the face and gate roads by a five-way cable. Instructions, requests, etc., made into any one of the handsets are broadcast simultaneously over all the loudspeakers. Calling can be done either by direct speech or by the injection of a tone into all the loudspeakers. These units have been extensively tested underground and have now reached the stage of being manufactured commercially by A. T. & E. Company (Wigan), Limited.

An extension to the system has been developed whereby it will be possible to lock out the conveyor from any of the telephone units (or intermediate positions), and at the same time give an indication on a unit in the gate road of the position along the face where the lock out originated. This equipment will be shortly tested underground and it is hoped that it will be in production by the end of 1961.

Remote Indication

It has often been proposed that in addition to an efficient telephone system, a modern colliery should have a telemetery system which could display selected information either at a point underground or on the surface. A number of pits are,

in fact, already equipped with a multichannel carrier system which transmits " on-off " signals related to whether or not machines are operating.[10] While this information is useful, much more value could be gained from the transmission of quantitative data. For example, readings of such items as methane concentration, ventilation current, temperature and humidity at selected points, output on conveyors, quality of the product, electrical power consumption in various districts, etc., would provide a useful picture of what was happening underground and assist in the general control of underground operations.

Although this has not been the subject of any specific MRE project, it has been continuously borne in mind, and a number of units have been developed which could be used to this end. One which is thought to have great potentialities would enable the outputs of the flame methanometers to be continuously displayed and recorded so that any build up of gas could be seen and, if necessary, made to sound an alarm.

The first quantitative application of this technique is, in fact, the remote measurement of high concentration methane in the underground drainage system at Haig Colliery,[11] where the concentration at seven underground points is continuously displayed on a multichannel recorder in the surface calorimeter room, and made to sound an alarm if preset limits are exceeded. During the two years it has been in operation invaluable help has been afforded to the efficient operation of the drainage system, *e.g.*, the time taken to balance the network whenever changes have to be made at the various boreholes has been greatly reduced and a much tighter control achieved. It has also increased the safety of operation as a leak in the pipe range can now be quickly detected. Already in this relatively short period the capital outlay has been recouped several times over.

Safety of Electrical Equipment

Repeated reference has been made to the fact that this new range of instruments and instrumentation is intrinsically safe. This has been achieved by careful design and the use of transistor techniques. Since the published knowledge on this subject is still somewhat restricted, one group at the MRE is entirely devoted to this study. It has as its two principal tasks a fundamental investigation of the underlying factors of intrinsic safety and an ever-increasing amount of applied work. Thus it is possible to test, in accordance with the procedure followed by the testing branch of the Ministry of Power, any new circuit or equipment developed by the establishment and thereby ensure that when the equipment is submitted for formal approval it will be acceptable for underground use.

One problem that is currently receiving considerable attention is the safety of pilot control circuits used in early models of " gate-end " boxes, of which considerable numbers are still in use. As knowledge has increased and the standards of safety improved, a large number of units cannot now pass the accepted safety requirements. The replacement of all these units by modern ones would necessitate considerable expenditure and, consequently, the possibility of being able to bring these suspect units up to present day standards by the addition of a number of simple cheap extra safety devices, is being investigated.

Ad Hoc Investigations

Although the establishment, in common with other departments, is having to work to a tight budget, it can from time to time undertake investigation of divisional problems which require an immediate solution that can only be achieved by providing some form of instrumentation. Thus, for example, it has devised means of detecting cracks in Sandvik rubber-covered steel band conveyors, which, if not found and removed, led to the belt breaking and resultant loss in production. It has also provided means to examine a faulty plate conveyor and is currently examining the cause of failure in a new type of bunker conveyor. Similarly it has assisted in providing a simple and cheap electrical weighing system for use on a gravity operated endless rope dirt disposal unit.

Remote Control of Cutter Loaders

How far " automation," or more precisely, remote control can be applied to the winning of coal is still a matter for considerable speculation. Nevertheless, it is generally accepted that a major improvement in efficiency can only be achieved by the introduction of more mechanization used in its fullest sense.

The MRE has for some time been examining the possibility of providing remote control of all the operations which occur at the coal face. The problems can be divided into two main headings—remote control of the coal-winning machine and remote control of the roof-support system.

The basic problem is to control the movement of the machine so that it is always kept within the seam and to do this it is necessary to know where the machine lies with respect to the roof and the floor of the seam. In addition, the position of the machine along the face must be known and it must be possible to keep the face straight. An ancillary problem is that of automatically handling the instrument and power cable (if required) of the machine.

Considerable progress has been made towards the satisfactory solution of the first and most important problem. A nucleonic coal sensing instrument has been devised which can measure the thickness of coal left on the floor of the seam. The basic principle used is the measurement of the density of the strata underlying the unit by a gamma ray back scattering unit. Fig. 5 shows diagrammatically such a unit resting on a layer of floor coal and the underlying strata. Gamma rays from the radioactive source are scattered in all directions by the atomic particles in the coal and rock. The amount of scattered radiation eventually reaching the geiger counter is, approximately, inversely proportional to the density of the scattering medium,

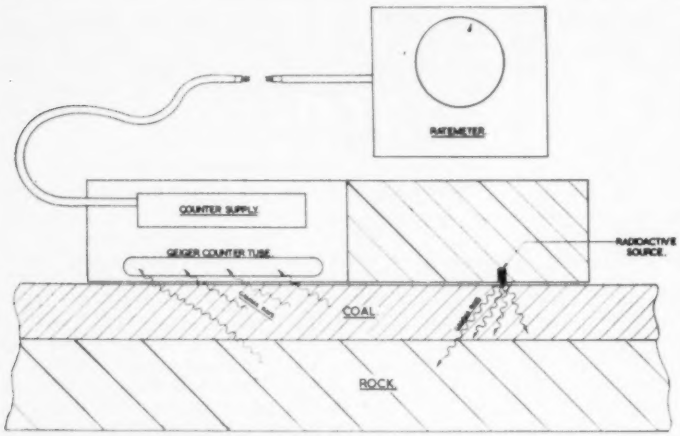

FIG. 5.—DIAGRAMMATIC LAYOUT OF THE MRE COAL SENSING PROBE.

i.e., more will come back from coal than from rock. Thus, as the amount of coal between the source and the underlying rock changes, so the amount reaching the geiger counter and the associated counting unit (the ratemeter) will change and, consequently, the output of the meter can be calibrated in terms of the thickness of the floor coal.

Two units based on this principle have been in operation on a Midget miner at New Lount Colliery since July, 1960 (Fig. 6), and are proving to be extremely useful in providing information by which the operator can keep the machine in the seam.[12] At present only visual indication is provided, but work is proceeding on the development of an electro-hydraulic servo unit, which, when fitted between the output of the indicating meters and the steering controls, will enable the machine to steer itself automatically in the vertical plane.

This same device could obviously find application on other power-loading machines such as the trepanner or shearer, which present problems of steering in the vertical plane. Besides facilitating the easy movement of the machine it would obviously improve the quality of the product, as less extraneous dirt from the roof or the floor would find its way onto the scraper conveyor. Work is proceeding on this aspect of the problem in conjunction with the Central Engineering Establishment of the NCB.

The solution to this problem must obviously be based on the remote operation of self-advancing supports which are being used more and more on our coal faces. Two schemes are at present being investigated, the first being an all hydraulic system in which the entire control is achieved by means of interlocked hydraulically operated valves. Movement of the chocks is initiated by the application of pressure to a pilot line connected to the first chock. This results in the chock being lowered, pulled forward, and then reset against the roof. After these movements have been successfully completed, pressure is automatically applied to the pilot line of the next chock which then is advanced and reset, and, subsequently, the signal is passed on to operate the remaining chocks in turn. If, for any reason, a chock should fail to complete the correct sequence of operations then the automatic movement is halted. Advancement of the conveyor is achieved by the application of power to a separate line which feeds some or all of the pusher rams. If this pressure is applied continuously then it is automatically cut off on each chock in turn as that chock is being reset. In the alternative control scheme each chock is fitted with two electro-hydraulic valves which can be operated from a control panel situated in the gate road. This allows for greater flexibility as the movement of each chock can be individually controlled.

FIG. 6.—INSTRUMENTATION FOR THE COAL SENSING PROBE FITTED TO THE MIDGET MINER AT NEW LOUNT COLLIERY.

With any remotely operated system it is essential that means be provided whereby the state of each chock can be ascertained without having to crawl along the face. To achieve this an intrinsically safe remote indication and control system has been designed which continuously monitors the condition of each chock in turn. It measures, and indicates, the pressure in the chock legs, to check whether or not they are under load, and also indicates the position (extension) of the pusher rams, and, if any preset limits are exceeded, the sequence is halted and an alarm sounded. All these operations, including in the electro-hydraulic system the actual control of the movement of the chocks, are effected over a multicore cable. Up to 256 chocks can be controlled over a single 25-core cable.

The control unit incorporates a number of transistor counting circuits and is accommodated in a box which measures only 14 in. by 10 in. by 12 in. It is of interest to note that a number of miniature lights are used to indicate the positions of the chocks and that these, together with the rest of the control system, are intrinsically safe. Preparations are now being made for an underground trial to be carried out early in 1961, with 24 remotely operated Gullick chocks, in the North-Eastern Division.

If this experiment can be taken to a successful conclusion then another major step towards the establishment of a remotely operated face will have been accomplished. Undoubtedly a number of important problems still remain to be solved before such a face can be set up, but, as far as instrumentation techniques are concerned, it can be confidently stated that there is nothing to prevent this becoming a reality in the next few years.

Conclusion

It has been attempted in this paper to outline briefly, the impact of the underground instrumentation work of the MRE on the industry. In trying to give an overall picture it has not been possible to go into technical details, but those that have not already been described in published papers will be covered in future articles. It is hoped that this review will have made it apparent that an increasing use is being made by the coal-mining industry of modern measuring techniques and that they may well have a major part to play in improving the economy of the industry.

The author is grateful to Dr. W. Idris Jones, director-general of research, National Coal Board, for permission to publish this paper. The views expressed are those of the author and not necessarily those of the board.

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DISCUSSION

MR. L. J. MILLS, referring to the impurity of the butane which was used as a fuel in the methanometer, asked if the impurities would cause any false readings due to their effect on the flame when methane was present.

Replying, the AUTHOR said if Calor gas, which was a variable mixture of butane and propane, was used, a variation in results was obtained when testing. Gas "A" to British Standard Specification was used because of the reasonably tight control of butane present. If Calor gas was used the flame did rise above the normal level, but the methanometer functioned normally.

MR. J. SMITH asked if any development was taking place to make the 50-ton load cell automatically recording instead of being used to obtain spot readings. Very often, vital readings were missed through the want of a continuously recording instrument. He also asked if the author believed that the present strain gauge extensiometer gave a truly representative indication of the strain in the roof strata, bearing in mind that it only extended for some 8 in. along the roof and only bolted into the first 3 in. Would it be possible to measure the change in strain of the strata by bolting say a 5-ft. rod along the roof and measuring the strain over that distance?

Regarding the Romometer used to measure the lateral movement of the roof and floor, Mr. Smith asked if it was possible to make this instrument continuously recording, and if it was possible to separate the roof movements from those of the floor. Such an instrument might be of value when investigating the roof movements on faces before and after the installation of powered supports, as excessive lateral movement often resulted in bending of the legs on self-advancing supports.

In reply, the AUTHOR said they had been working on the design of a recorder but because of the limited effort available at the Mining Research Establishment this particular project had been really depending on outside manufacturers. A standard commercial recorder was used and modified for pit use. Difficulties were met because the manufacturers did not want to make any more. A unit was available which would enable the measurement of roof loads between 15 and 20 lb., and could be installed in a very small recorder, using the same 3-in. or more chart as the methanometer. It was intrinsjcally safe and enabled measurement up 20 lb.

A device had been produced which would enable strains to be measured 5 ft. in the roof, but never ahead of the face other than with the borehole plug. With this device a hole was drilled into the rock and a brass plug put in. Any change in stress on the rock or coal was indicated in the measurement of the strain gauges themselves. A tool had been made

which enabled the measurement of relative movement between the roof and floor and which gave a reading of convergence.

MR. G. B. DAWSON asked, bearing in mind the shortage in the coal-mining industry of highly skilled electricians and mechanics of the mine, how the author anticipated the future expansion of this equipment, taking into account the maintenance problems created.

This was a problem that certainly existed, replied the AUTHOR. Obviously if more instrumentation was to be introduced more people would have to be trained to maintain it. The problem could be partially solved by designing the complete unit in sections so that it would only be a matter of taking out one piece and putting in another underground. It meant carrying a certain number of common spares on the surface and until there were sufficient maintenance staff, the manufacturers would have to be called upon for spares.

MR. T. W. PETERS asked if any work had been done with regard to the investigation of strata characteristics from exploratory boreholes, either to predict coal seams in a borehole or to detect the dimensions of faults, particularly larger ones.

In reply, the AUTHOR said that the work on coal sensing started with this application in mind rather than for machines because there was a specific need for an instrument at the underground gasification project. A borehole probe which would fit into a shothole had been produced. It was a coal sensing machine and this had been used in surface borehole experiments in Durham where a coal seam had been located from the surface and its thickness estimated. However, work had to stop due to the pressure of other projects. The same probe obviously could be used for underground boreholes to pick up coal seams and measure the distance at which they were encountered. If there were washouts at the face, a series of shotholes could be bored to find the coal.

Mining experiments would shortly be carried out in Durham where a series of boreholes along the face were to be drilled.

Spiral Gummer

ELIMINATION of difficulties resulting from the carrying back of fines under an armoured face conveyor was the aim of Mr. A. Holmes, a mechanization team leader in the National Coal Board's North-Eastern Division, in designing the Holmweb conveyor cleaner.

The device is driven by a chain from an attachment to the dummy shaft using a jockey pulley to take up slack.

It will fit any single-drive gearhead, and can easily be attached to existing conveyors by boring two ¾-in. holes in the side of the headframe and removing the blanking-off cover. Shear pins and/or a slipping clutch are fitted to act as a safeguard against overloading.

Steel Mill at Chittagong

The proposed steel mill to be set up at Chittagong, East Pakistan, will initially produce 100,000 tons of steel per year and its construction would require, in the first stage, a sum of about Rs 110,000,000, according to Mr. Abul Kasem Khan, Industries Minister. The report of the Japanese team on the proposed mill has been received by the Government. A number of Japanese concerns are expected to participate in the building of the plant.

National Coal Board Specifications

SPECIFICATIONS recently issued by the National Coal Board include those mentioned below. Specifications may be obtained from the board at Hobart House, Grosvenor Place, London, S.W.1, the charge for each one being 6d. unless otherwise stated.

No. 247/1960 applies to galvanized wire netting with meshes hexagonal in shape.

No. 132/1961 (superseding P. 132/1956) covers the marking of fire-resistant brattice cloth for use by the National Coal Board.

No. 243/1961 relates to light industrial shelving for the storage of documents and other records.

No. 244/1961 (1s. 6d.) covers fire-resistant properties, electrical properties, dimensions, power ratings, identification markings, and other requirements of power-transmission V-belts.

Oil resistance is included in the specification as a general requirement and it is intended, in due course, to add specific test requirements.

No. 246/1961 refers to chain link fencing of the types scheduled in Table I of BS 1722:1951, Part I, which also indicates the purpose for which each type is suitable. Requirements for suitable concrete posts and for timber preservation treatment are also covered.

No. 248/1961 relates to ground thread screwing taps for various types of thread.

No. 250/1961 gives the overall dimensions for circular screwing dies for all sizes of thread up to 2-in. BS parallel pipe thread, and the dimensions for hexagonal die nuts for all sizes of thread up to 4-in. BS parallel pipe thread.

No. 251/1961 lays down requirements for the following types of twist drills for general engineering use:—Stub drills; parallel shank jobber series twist drills; parallel shank long series twist drills; taper shank twist drills; oversize taper shank twist drills; bit stock twist drills, and combined drills and countersinks (centre drills).

FORTHCOMING EVENTS

JULY 17 and 18

Institution of Mining Engineers:—Junior section meeting in Nottingham.

JULY 19-21

Institution of Mining Engineers:—Summer meeting in Nottingham.

US Briquetted and Packaged Fuel

The output of fuel briquettes in the United States in 1960 was 744,000 short tons (2,000 lb.), compared with 866,000 tons in 1959. There was a gradual fall from 1957, when output was 1,104,000 tons. The average for 1947-49 was 2,901,000 tons. The average price per ton was about $14 in 1959 and in 1960. Exports in that year amounted to 13,000 tons, being less than half the 1959 figure. Trade both in fuel briquettes and packaged fuel continued to decline.

A NEW ALLOY STEEL

Esshete 1250 in Commercial Production

COMMERCIAL production of a new alloy steel designed for service temperatures up to 675 deg. C. has been started by Samuel Fox & Company, Limited, a subsidiary of the United Steel Companies, Limited. Known as Esshete 1250, this austenitic creep-resisting steel is the outcome of five years of research and testing, with the result that unusually comprehensive data is available on its properties and performance.

Esshete 1250 is a 15 per cent. chromium, 10 per cent. nickel, 6 per cent. manganese steel, the composition including smaller percentages of silicon, molybdenum, vanadium, niobium and boron. It combines a high level of rupture strength with adequate ductility, good weldability, structural stability, and oxidation resistance at elevated temperatures for long periods. It also has good manipulation properties. The steel is thus well suited for service in power stations of advanced design.

Sheet Trials in Progress

Esshete 1250 has proved satisfactory in the production of bars, tubes, and large forgings; sheet trials are in progress. Large bars, tubes, and plate can be readily fabricated in either the hot or cold condition, cold forming being understood to include temperatures not exceeding 650 deg. C. and hot forming not less than 900 deg. C. Whichever method of prefabrication is adopted, the material requires a re-solution treatment within the range 1,050/1,150 deg. C.

In extensive weldability trials, employing various experimental and commercial electrodes, Esshete 1250 gave excellent results.

The structural stability of the steel compares most favourably with other more conventional austenitic steels. Its oxidation resistance has been assessed by a combination of laboratory tests and exposure in an experimental element in a power station for a period of approximately two years. In this case, too, Esshete 1250 has shown similar characteristics compared with other austenitic steels of the same chromium content. The mechanical properties of the steel are shown in Table 1.

Particular attention has been devoted to the stress-to-rupture properties of Esshete 1250, the test programme having covered a period of 25,000 hr. to date. The results of this extensive testing are summarized in Table 2.

TABLE 2.—*Results of Stress-to-rupture Tests.*

Time.	600 deg.C.	625 deg.C.	650 deg.C.	675 deg.C.	700 deg.C.
Hr.	Ton/sq.in.	Ton/sq.in.	Ton/sq. in.	Ton/sq.in.	Ton/sq.in.
100	24.0	20.5	18.0	16.3	15.5
300	22.0	18.5	16.5	15.1	14.6
1,000	20.0	17.0	15.0	13.5	13.0
3,000	18.5	16.0	14.0	12.0	10.0
10,000	16.8	14.5	12.5	10.4	7.5
30,000	(15.0)	(13.3)	(11.4)	(8.9)	(5.8)
100,000	(13.9)	(12.5)	(10.8)	(8.2)	(4.5)

TABLE 1.—*Typical Mechanical Properties—Solution Treated.*

Test temperature (deg. C.).	Tensile strength (ton/sq. in.).	Proof stress (ton/sq. in.).		Limit of proportionality (ton/sq. in.).	Elongation on 4 A (per cent.).	Reduction of area (per cent.).	Modulus of elasticity (ton/sq. in).
		(0.1 per cent.).	(0.2 per cent.).				
20	39.0	13.8	15.0	7.0	67.0	69.6	13,400
100	34.3	10.6	11.6	5.2	64.5	72.0	13,000
200	31.8	9.9	10.1	4.2	55.0	70.3	12,500
300	31.4	8.5	9.4	3.6	45.0	64.0	11,900
400	31.5	8.6	9.1	4.4	47.7	60.8	11,300
500	30.3	8.2	8.8	4.8	40.5	60.8	11,700
600	28.5	8.2	8.6	4.8	47.4	64.0	10,200
700	23.0	8.1	8.5	3.6	40.0	51.2	9,650

Creep testing up to 10,000 hr. has been carried out to determine the stress to give 0.1 per cent. and 0.2 per cent. strain. The results of these tests are summarized in Table 3.

Like other austenitic steels in the solution-treated condition, Esshete 1250 has low proof-stress values. These can be improved by warm working, and this process is found, in fact, to push up the 0.1 per cent. proof stress to 32 ton/sq. in. at room tem-

TABLE 3.—*Results of Creep Tests.*

Deg. C.	Stress for 0.1 per cent. creep strain.			Stress for 0.2 per cent. creep strain.		
	1,000 hr.	3,000 hr.	10,000 hr.	1,000 hr.	3,000 hr.	10,000 hr.
	Ton/sq. in.	Ton/sq. in.	Ton/sq. in.	Ton/sq. in.	Ton/sq. in.	Ton/sq. in.
650	7.60	6.00	5.15	7.80	7.25	6.65
675	6.55	5.45	4.70	7.30	6.50	5.60
700	4.90	3.60	1.80	5.60	5.30	3.10

perature and 23 tons/sq. in. at 625 deg. C., while still holding elongations on 4 A of the order of 48 per cent. and 25 per cent., respectively. The hardness of the steel is not altered at 625 deg. C., but at room temperature is the equivalent to 43 ton/sq. in. ultimate tensile strength, which is only slightly more than in the normally rolled condition.

Warm working also improves the creep properties, so that the steel is well suited in this condition for use as a high-temperature bolting material.

Large Versatile Forging Press

TO meet the need for still larger closed-die forgings, so far limited by press capacity, a new 20,000-ton press has been installed at Cameron Iron Works, Inc., Houston, USA. Its weight is around 1,350 tons, which, with concrete foundations, reaches a total of about 1,800 tons.

According to an article in Iron Age (January 12, 1961), there are basically two ways in which to cause metal to fill a die, the almost universal practice being to close it on an excess of metal, the surplus escaping in the form of a flash. The dies of the new press totally enclose the hot metal, the movement of multiple rams flowing and working it under high internal pressures. Results include high physical properties, with uniformity between transverse and longitudinal.

The absence of flash eliminates the notch effect attributed to flash lines. A single heat suffices to complete a forging. Grain refinement is uniform throughout. Thus, heat treatment can develop fully the capabilities of the metal.

The forging unit permits extrusions to be made vertically through the press, the frame of which is 50 ft. high and 30 ft. across the bottom. When desired, the operator drops the main piercing ram assembly out of the press, thus leaving an opening through which an extrusion up to 30 ft. long and 56 in. dia. can be formed. Split-die techniques can also be used, allowing ultra-large forgings of intricate shapes and sizes to be made. Vital to such operations is the new throttling control, which permits the press to be operated at any speed from 0-400 ft./min.

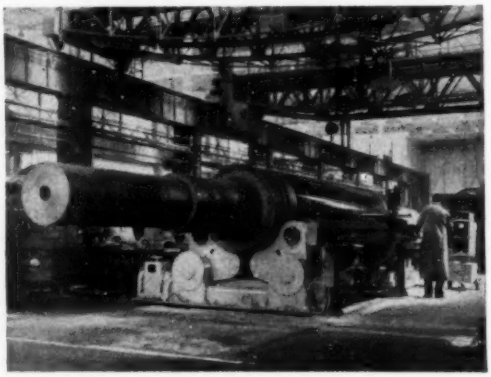
Working in conjunction with the new plant are two other large presses, one a 4,000-ton blocking and forming press and the other a 6,000-ton shaping and punching unit. Adequate heating and handling equipment is being installed.

ESTABLISHMENT OF an iron and steel industry, based on the domestic iron-ore resources, is proposed in Afghanistan's second five-year plan, states a Brussels report.

Ultrasonic Testing of Large Steel Forgings

ALTHOUGH ultrasonic examination has been standard practice for some years at the Atlas Works, Sheffield, of Thos. Firth & John Brown, Limited, recent trends in connection with the generation of electric power have increased its importance.

Rotor forgings are larger and heavier; in addition, they are more highly stressed. Thus, it is important to ensure that no defect which could



A LARGE STEEL FORGING BEING ULTRASONICALLY TESTED AT THOS. FIRTH & JOHN BROWN, LIMITED, SHEFFIELD, USING SPECIALLY DESIGNED AUTOMATIC ROTATING EQUIPMENT.

cause failure in service goes undetected. The increase in weight makes manual manipulation almost impossible.

To facilitate ultrasonic examination of these important forgings, specially designed automatic rotating equipment has been installed in the company's heavy machine shops.

EXTENSIVE DEPOSITS OF COAL IN PAKISTAN

THE Geological Survey of Pakistan has found large deposits of lignite coal in Dadu district in an extensive area of about 40 to 50 square miles. A detailed survey of the area showed, according to Mr. Z. A. Bhutto, Pakistan's Minister for Power and Natural Resources, that coal was located near about the Khirthar range of hills in Dadu. The reserves were estimated to be over 30,000,000 tons, the Minister said.

The Government had recently granted exploitation and prospecting concessions to about six parties, including the Pakistan Industrial Development Corporation. A sample of this coal has been sent to West Germany for processing and examination.

Metallurgical Progress

Some abstracts from recent reports on research and development, at home and abroad

Two-stage Producer Gas and its Applications. A. H. O. JOHNSON. (J. Soc. Glass Technology, 1960, Vol. 1, No. 6, pp. 260-7.) The author briefly surveys the improvements in gas producers and the development of two-stage generators during the last 20 years. The principles of the two-stage generators are discussed and the separation of the process of distillation of the volatile products from the gasification of the coke by the steam/air blast is described. The practical development of commercial plants for the production of three types of producer gas (hot raw gas, hot detarred gas, and cold clean gas) is discussed. Typical operating data are given and the utilization of the gas is considered. The methods of gas cleaning and treatment of by-products are given. The two-stage method of gasification enables the by-products to be obtained and easily handled, thus enhancing their value and at the same time reducing the effluent to a minimum.

The types and range of brown and bituminous coals which can be gasified in the two-stage producer are described and illustrated by reference to the fuels now being gasified in two-stage plants in various parts of the world. This leads to a discussion of thermal efficiency both in respect of the gas and the by-products. Reference is made to the particular advantages of the two-stage producer, which are helpful in fulfilling the requirements of the Clean Air Act, 1956, and which cannot be realized with single-stage producers. Finally, attention is drawn to the economic questions relating to the production and utilization of two-stage producer gas.

Smelting Unfired Iron-ore Pellets in an Experimental Blast Furnace. N. E. MELCHER and M. B. ROYER. (Blast Furnace and Steel Plant, 1960, Vol. 49, No. 6, pp. 1265-1270.) This report describes preliminary experiments by the Federal Bureau of Mines on the practicability of adding raw pellets of taconite concentrate to blast-furnace feeds. The bureau research demonstrated that raw pellets could be smelted successfully in an experimental furnace with no significant change in coke consumption and only a moderate increase in dust losses. The dust loss was 43 lb./ton of metal for an all-pellet charge, compared with 7 lb./ton for an all-sinter charge. Raw taconite pellets undergo only slight degradation during charging to the furnace if 1 per cent. bentonite is used as a binder. Raw taconite pellets, although subject to some degradation, did not seriously lower the permeability in the furnace.

The use of raw pellets in the experimental blast furnace caused no unusual operating problems as compared with a base period using high-grade sinter. A 4 per cent. drop in production from all-sinter to all-pellet burden, at the same coke rate, resulted in part from a decrease in the metallic content of the materials charged.

Ferro-alloys, Steelmaking, and the Future. F. E. VAN VORIS (Journal of Metals, 1960, Vol. 12, No. 12, pp. 940-4.) The expanding production of steels with better properties has been dependent to a large extent on the development of improved ferro-alloys. The author summarizes recent developments and gives brief examples of improvements in plain-carbon rimming steels, aluminium-killed steel, aluminium-killed sheet, non-ageing deep-drawing rimming steel, semi-killed steel, free-machining steel, columbium-treated carbon steel, killed-carbon steel, and killed low-alloy steel.

Cost Effects of the Chemical Qualities of Sinter Fuels. J. GRIFFEN. (Blast Furnace and Steel Plant, 1960, Vol. 49, No. 5, pp. 1164 and 1175-8.) The author considers only the production of "straight" sinters and excludes consideration of "self-fluxing" and "burden-fluxing" sinters. The primary purpose was to find the cost of smelting the ash of the sinter fuel. A careful evaluation has shown that the effects of small amounts of ash on blast-furnace performance and costs are larger than suspected, and, when calculated to equivalent values per net ton of "as received" sinter fuel, are considerable and can have a big influence on the final choice of sinter fuel. Typical examples of the more generally available sinter fuels of various qualities were selected, *i.e.*, anthracite No. 4, by-product coke breeze, and beehive coke breeze. The as-received analyses are used as they determine commercial prices or values. The moisture contents given are representative of commercial shipments and experience.

The data indicate substantially equal values for sinter production rate and strength with all types of fuel given when the fixed carbon content of the sinter mix is 5 per cent. To simplify this study, it is assumed that these factors are identical when the same amount of fixed carbon in each sinter fuel is used in the sinter mix.

Construction and Design Problems Involved in a New Sintering Plant. R. A. SLATER. (Iron and Steel Engineer, 1960, Vol. 37, No. 12, pp. 114-7.) Raw material storage in the main building is provided by 10 circular bins, each 45 ft. high, located in 24-ft. bays. Each bin is equipped with a table feeder for regulated withdrawal of material. A complex proportioning system accurately controls the constituents of the mix. Fundamentals of the system include six ore bins, one miscellaneous bin, two fuel bins, one cold-returns bin, one hot-returns bin, the belt scales, and the bin-level probes and the saucer. It is a constant-weight, gravimetric-type system.

The flow of ore to the system is controlled by variable-speed table feeders, regulated in groups

of two. The addition of miscellaneous materials is accomplished by scale feeders, which are integral, self-contained units. Each of these is interposed between the table feeder which it services and the collecting belts. Units are designed to weigh and regulate, within 1 per cent., a portion of the material which is often less than 10 per cent. of the total on the belt at that point. The system is sensitive to changes in total weight being delivered to the machine.

Preparation of the sinter mix is accomplished in two 18-ft. dia. mixers. To avoid segregation, a swing-spout chute is installed at the junction where the split to each mixer is made. All additions to the mix are under the supervision of electronic equipment. Prepared material is delivered to the feed well of the sintering machine. This machine is equipped with forced lubrication, a natural-gas ignition furnace, and a revolving sinter breaker.

How Heat Contours Metals. ANON. (Iron Age, 1960, Vol. 186, No. 233, pp. 118-9.) In the fabrication of many products there is a need for contour cutting or shaping blanks. Many metals, including stainless steels, can be cut either with a manual torch or by a mechanical shape-cutting set-up. Tungsten-arc cutting uses a constricted arc between a tungsten electrode and the workpiece. Also, it makes use of a high-velocity gas stream. The arc is concentrated and localized upon a small working area. Its intense heat, about 15,500 deg. C. melts the metal. The gas, which is preheated by the arc, expands. This gas is forced through a constricting orifice. The usual gas mixture consists of 35 per cent. hydrogen and 65 per cent. argon. Molten metal removed by the jet action forms a "kerf." The cutting gas protects the walls of the cut from oxidation. The heat and force of the arc's stream combine to yield a high-quality, saw-like cut.

One of the advantages of the tungsten arc is its fast-cutting speed on heavy materials. The maximum thickness of stainless steel for production cutting is 2 in. With electron-beam cutting, adjustment coils direct the beam through the centre of a magnetic lens, so focusing the beam to a fine spot on the work. When the beam hits the work surface, the high-velocity electrons give up their kinetic energy. This energy is transformed into a high thermal energy which vaporizes the material. Deflection coils cause the beam to oscillate so preventing overheating and distortion. Most materials can be cut or drilled to small complex shapes and close tolerances.

Recently, the plasma jet has been used as a metal-shaping tool. This is essentially an electric arc which is constricted by a gas to a superheated, slender beam. When the gas is ionized, it constricts the beam further and thus raises the temperature.

A Continuous-buttweld Mill Modernizes Pipemaking. ANON. (Steel, 1960, Vol. 147, No. 24, pp. 86-90.) Coiled skelp is turned into buttweld pipe at speeds of 150 to 700 ft. per min., on a continuous mill at the national tube division of United States Steel Corporation. This mill will produce 237,000 tons of pipe annually, with diameters ranging from 1.25 to 4 in. Each coil of skelp is rotated on a cradle truck until it is in the right position for the coil peeler, which opens the coil and bends the skelp so that it can be fed into the pinch rolls of the uncoiler-leveller. When the skelp is started through the leveller, the coil is transferred to an expanding mandrel. An upcut shear squares the leading end of each coil and the trailing end of the coil preceding it, so that the ends can be joined. A flash-welding device seizes the two-coil ends, heats them and forces them together. After welding, the joint is reheated to relieve stresses, and a drawcut planer cuts the welded area down to the original skelp gauge.

Preheating and heating furnaces bring the skelp to the correct temperature. Next the skelp passes through the forming stand then through a welding horn and into the welding stand, where edges are pressed firmly together. The last five stands provide diameter and wall reduction. A seven-stand, stretch-reducing mill brings the welded pipe to its finished size. Multiple-pass rolls permit rolling of six pipe sizes without changing the rolls. The rollshafts of the multiple-pass, stretch-reducing mill are at 45 deg. from the horizontal, while the roll axes on successive stands are perpendicular.

Factors Affecting the Drawability of Sheet Steel. R. L. WHITELEY. (Blast Furnace and Steel Plant, 1960, Vol. 49, No. 6, pp. 1245-50.) Much emphasis has been placed on ductility as a prime requirement for good drawability, but the anisotropy of the steel is equally important. The superior drawability of aluminium-kil'ed steels has been recognized for some time, and AISI notes that special killed steels are customarily specified where the draw is particularly severe. The superior drawability of aluminium-killed steels over rimmed steels can well be attributed to the significant difference in the average anisotropy ratios of these two grades of steel, drawing-quality killed steels being consistently higher than those of drawing-quality rimmed steels. The higher anisotropy ratios of the aluminium-killed steels appear to be associated with the pancake-shaped grain structure in these steels.

Aluminium-killed steels which do not have the pancake-shaped structure are usually found to have low anisotropy ratios. Usually, these steels exhibit poor drawability. By assuring that the proper grain structure is obtained in drawing-quality killed steels, the producer is, in effect, controlling the anisotropy of the steel. Much more work needs to be done in the study of the anisotropy of low-carbon steels —both in its relation to drawability and its control in the mill.

A New 110-ton Kaldo Unit in France. F. WESTON STARRATT. (Journal of Metals, 1960, Vol. 12, No. 11, pp. 853-6.) At the Société Lorraine de Laminage Continu (Sollac), the Kaldo plant has been installed in an extension of the spacious open-hearth shop, with the basic-Bessemer plant at the opposite end of the building, and the hot-

metal mixers located between the basic-Bessemer and the open-hearth shops. The first six months of operation of the Kaldo furnace have shown that it is capable of producing higher quality low-carbon, deep-drawing steel at a lower cost than is possible with the open-hearth furnaces at Sollac.

Sollac's Kaldo steel is being produced from hot metal of the following percentage analysis:—C, 3.5; Mn, 0.35; P, 1.75; S, 0.040; Si, 0.5. Kaldo steel has been produced according to the following average analysis:—C, 0.05 to 0.07; P, 0.014 with a 0.017 maximum; Mn, 0.250 to 0.400; S, 0.012 with a 0.018 per cent. maximum. This installation consists of two interchangeable 110-ton Kaldo furnaces and one blowing stand. The total weight of the furnace shell, with running rings, is 196 tons, with an additional 300 tons for the lining. The maximum rotation speed is 30 rev./min., and the inclination of the vessel during the blow is 17 deg. Oxygen of 99.5 per cent. purity is supplied at a pressure of 43 lb./sq. in. The water-cooled oxygen lance consists of three concentric copper pipes, the inside of which is narrowed at the mouth to 4.33 in., with an expanding nozzle.

A Venturi washer is used for dust removal. Some 10 lb. of dust per ton of steel is removed from the fume. Sollac has been blowing the Kaldo furnace on a one shift/day basis, but three shifts/day operation is planned for the near future. This factor, together with the installation of certain ancillary equipment, and increased operating experience, is expected to reduce tap-to-tap time, increase refractory life, and result in an even more efficient operation.

Non-metallic Inclusions—their Quantitative Extraction from Steel. H. WALZ and R. A. BLOOM. (Journal of Metals 1960, Vol. 12, No. 12, pp. 928-32.) The purpose of this study was to investigate the possibility of obtaining a complete, quantitative extraction of oxide inclusions from low- and medium-alloy steels. The procedures for extraction of non-metallic inclusions from steel involve the elimination of the metallic components leaving a residue of non-metallic materials. There are three general residue methods, namely:—Acid, halogen, and electrolytic. An electrolytic extraction apparatus has been developed. The cell consists of two chambers separated by a porous porcelain diaphragm. The sample is suspended in the inner cell through a lucite cell lid. The anode shaft is insulated from the anolyte with a nylon sleeve, and the residue, falling from the sample during electrolysis, is collected in a residue dish.

A continuously flowing electrolyte is used and a constant liquid level is maintained in the inner cell. An arrangement maintains the liquid level in the inner cell without disturbing the gravity-flow pattern, established by the formation of liquids of higher specific gravity during the electrolysis. The outer cell contains the catholyte, the cathode screen, and the inlet and outlet for the inert atmosphere used during the electrolysis. A constant-current d.c. supply with an operating range of up to 4 amp., provides the power. The cells are connected in series with each cell circuit containing a Zener Diode which shorts out any individual cell which fails to function. A residue-purification apparatus consists of a chlorine source, reaction chambers, and vacuum systems.

Initial studies concerned the effects of the treatment using synthetic materials. A chlorination temperature of 245 deg. C. is sufficient for removal of iron carbide. Where there may be the more stable carbides in the residue, they are given a short, intermediate, higher-temperature chlorination (400 deg. C.) to assure complete carbide removal.

Hydraulic Bulge Tester Determines Sheet-drawing Quality. W. N. LAMBERT, E. S. MADRZYK, and F. E. GIBSON. (Journal of Metals, 1960, Vol. 12, No. 11, pp. 857-60.) Many investigators have mathematically analyzed the stress-strain relationships involved in a hydraulic bulge test and have derived expressions which conform very closely to observed data. A bulge tester was designed and built with a 10-in. dia. bulge opening. The two parameters—height of bulge and pressure were measured simultaneously during the test. The machine was tested for reproducibility. Duplicate tests were run on various gauges and grades of sheet steel, and it was found that the bulge results were reproducible within the limit of error of the measuring instruments.

The upper portion of the bulge curve can be represented by the general parabola equation:—$p = C_1 h^2 + C_2 h + C_3$. A method has been developed to determine accurately the instability point for biaxial tension. In order to compare the drawing quality of steels of different gauges, a correction factor of 5.636 in. per inch of gauge must be employed. Subsequently all the h values have been corrected to a standard gauge of 0.050 in.

Technology of the Dwight-Lloyd McWane Iron-making. T. E. BAN and B. W. WORTHINGTON. (Journal of Metals, 1960, Vol. 12, No. 12, pp. 937-9.) The D-LM process consists of the continuous smelting of carbonized pellets in a conventional submerged-arc furnace. Raw materials are blended, ground, and balled into green pellets. These are dried and ignited to initiate carburization, which includes coincidental combustion, reduction, and agglomeration, and results in a highly beneficiated feed for subsequent smelting. The control of the green-pellet composition and carbonizing-draught rates is sufficient to maintain ample residual carbon for completion of endothermal smelting and carburization of the metal. Ordinarily, smelting conditions are controlled for producing grey foundry iron, but the system has adequate flexibility for the manufacture of silver, white, basic, and low-carbon pig-irons.

The electrical-energy requirements decreased more than a half, while furnace productivity was more than doubled over that of normal practice. The D-LM process has several noteworthy features: (1) Substitution of ordinary non-coking coals for metallurgical coke. (2) Green-pellet strength is

comparable to that of taconite, attained by using coarser-mesh materials. (3) Extremely rapid carburizing reactions within the bed of the Dwight-Lloyd machine, involving a retention period of less than 12 min. (4) A hot carburized product which is receptive to indirect reduction and rapid smelting rates involving electric furnace retention periods of 1 to 2 hr. (5) Homogeneous composition of the pellets which facilitates easier sampling and prevents segregation within the furnace.

How the Russians are Using Ultrasonics in Metallurgy. A. B. TESMEN. (Metal Progress, 1961, Vol. 79, No. 1, pp. 79-83.) One Russian institute has been subjecting freezing ingots to ultrasonic waves to investigate their effect upon metal composition, structure, and properties. Ingots of rimming steel were cast by three methods, namely:—(1) In a cylindrical mould with a magnetostrictive transducer on the bottom; (2) in a square mould with a magnetostrictive transducer on the top, and (3) in a cylindrical mould wih a piezo-electric (barium titanate) transducer placed in the hollow of the mould wall. While an untreated ingot (cast for comparison) contained 0.059 per cent. oxygen and 0.026 per cent. nitrogen, the ultrasonically cast ingot showed only traces of these gases. Gas bubbles, entrapped in the ingot, were reduced in size from a range of 5 to 25 mm. to 0.5 to 2.0 mm. Also, they were concentrated near the ingot surface.

Another research institute has been studying the effects of ultrasound upon solidification of several types of alloy steels and cast irons. Grain sizes were reduced, and dendritic structures either disappeared or were substantially lessened. In an experiment to determine the effect of ultrasonics on the heating rate of a nickel steel with low carbon and chromium, samples, with attached thermocouples were heated in an oil bath at 150 deg. C. With temperatures recorded every 30 sec., a vibration of one megacycle at 10.3 w./sq. in. decreased the time required to reach temperature from 9 to 6 min.

The effects of ultrasonic waves upon changes in metals and alloys in the solid state lead Russian scientists to believe that they aid transformation from a thermodynamically unstable to a stable state.

Induced Cracks in Moulds for Making Better Castings. ANON. (Steel, 1961, Vol. 148, No. 10, pp. 68-9.) Deliberately-induced microcracks in a ceramic mould are an aid in the production of precision castings. The ceramic material used for the moulds is composed of several refractory powders, a liquid medium based on ethyl silicate, with a small amount of a gelling agent. They are combined to form a slurry, which is poured over the pattern and allowed to gel. After this is formed, the refractory mass is stripped from the pattern. Then it is ignited and allowed to burn until all the volatiles are consumed and with this a three-dimensional pattern of fine cracks is produced. The cracks, dispersed throughout the body of the ceramic, are controlled in size. They are small enough to prevent the molten metal entering on account of its surface tension, but they are large enough to allow air and gases to escape. The microcracks permit expansion of the individual particles of refractory when the molten metal is cast against them so avoiding damage to the mould.

Forging-die inserts have been cast by this process. They were used to produce steel wheel guides cast in hot-work die steel, the inserts being used in the as-cast condition. Dropforging, press-forging, and swaging-machine dies are also being cast in this way, most of them with chromium-tungsten, hot-work alloys. Worn dies can be remelted and used in the casting of new ones, and the convenience of casting replacement dies means that there is little time lost due to die failure.

Other advantages claimed are the reduction of machining in die manufacture, improved die life, and a better casting finish. With the elimination of small inserts there is a reduction of blistering and excessive flash, while the absence of tool marks helps to prevent dragging and avoids the excessive use of lubricants or release agents.

Mount Isa Exploration

MR. J. W. FOOTS, general manager, Mount Isa Mines, Limited, stated recently that the company had almost 30 geologists permanently engaged on exploration work in authorities and leases in Queensland and the Northern Territory covering a total area of about 35,000 sq. miles. The search is for copper, silver-lead, zinc, and other metals. The company is no longer interested in uranium owing to the present world over-supply position.

The principal areas in which the search for new deposits is being concentrated are:—(1) The McArthur river district of the Northern Territory, high up in the Gulf Country; (2) the Blue Range district, located about 100 miles north-west of Townsville; (3) the Many Peaks area, 60 miles south of Gladstone; (4) the Chillagoe district, the well-known mineralized area 100 miles west of Cairns.

Mr. Foots stated that Mount Isa Mines was spending about £9,000 a month on exploratory work, which was a normal company operation, although the life of the mine on its present operating site was practically unlimited. Mount Isa Mines has also lodged applications for three temporary mineral reserves in the Yilgarn area (Western Australia) in which it already holds a large area. The new areas are in copper-bearing country and cover 1,350 sq. miles. One locality is Kumarina in the Peak Hill district; a second area is 814 sq. miles near Balfour Downs in the Nullagine district, and the third area is at Copper Mills, in the Marble Bar country.

Current Practice in Fuel Efficiency

Preliminary programme and registration form in connection with the eighth annual refresher course on Current Practice in Fuel Efficiency, organized by the National Industrial Fuel Efficiency Service, are now available from Ailsa House, 181, King's Road, Reading (Berks). The course will be held at the Clarendon Laboratory, Oxford, from September 25 to 29. The introductory address will be given by Dr. C. M. Cawley, chief scientist, Ministry of Power, and a number of distinguished lecturers will attend the various sessions.

COAL MINING in SOUTH WALES

Historical Review

ENTRANCE TO ABERNANT COLLIERY, NO. 9 AREA, SOUTH-WESTERN DIVISION, SHOWING TOWER WINDER IN BACKGROUND.

Some of the vicissitudes of the South Wales coal industry were traced by Mr. D. N. Simpson in his presidential address to the South Wales Branch of the National Association of Colliery Managers on May 30. In 1860, he pointed out, South Wales produced 10,000,000 tons out of a national production of 80,000,000 tons. The peak year was 1913, when the national output was 287,000,000 tons and South Wales produced 60,000,000 tons. Production in the South-Western Division of the NCB in 1960, at 19,500,000 tons, was almost back to the output of 1880.

EVIDENCE had been unearthed recently that the Romans burned coal in South Wales nearly 2,000 years ago; it was probably found in outcrops, Mr. Simpson said. Written evidence existed that the monks of Neath Abbey worked coal over 700 years ago. The earliest workings were in the form of levels into a hillside, or bell pits of shallow depth.

MR. A. MADDOX (LEFT) BEING INVESTED WITH THE BADGE OF OFFICE ON TAKING OVER THE PRESIDENCY OF THE SOUTH WALES BRANCH OF THE NACM FROM MR. D. N. SIMPSON (RIGHT).

The history of coal in South Wales has been linked to the iron and steel industry from the earliest days. Most of the early coalowners and colliery developers in South Wales were already established ironmasters, centred around Merthyr, Dowlais, and Ebbw Vale. Their production expanded as coke took the place of charcoal.

As a former manager of Abercynon Colliery, Mr. Simpson said it was pleasing to him to point out that the first steam locomotive in the world to draw a train on rails ran on February 1, 1804, from Penydarren ironworks, near Merthyr, to Abercynon basin, then the terminal of the Cardiff Canal. The year 1841 saw the opening of the Taff Vale railway from Cardiff to Merthyr. One of Stephenson's underground steam haulage engines was in use at Hendreforgan Colliery, Swansea Valley, in the 1840s.

Early records showed that prior to 1750 little coal was mined in South Wales except in Pembrokeshire and the lower end of the Neath and Swansea Valleys, while prior to 1800 there were collieries on the north crop near Merthyr and Dowlais, in the Eastern Valleys near Ebbw Vale,

in the Neath Area, Swansea Valley, near Llanelly, and in Pembrokeshire, as well as around Llantrisant. The Rhondda Valley was opened up in the early 1800s with levels near Gyfeillion in 1807, and the first pit was sunk in the Rhondda, at Dinas, in 1841. The first shafts in the Upper Rhondda were not sunk until 1855, at Treherbert.

The early methods of working coal in South Wales had progressed from levels and bell pits to fairly deep and extensive collieries by 1875, when the average depth exceeded 200 yd., and some pits were over 400 yd. deep. In the 1840s, pillar-and-stall working with either single or double stalls was universal, but by 1868 many South Wales collieries had changed over to longwall stall methods with hewing, filling, and packing by hand.

Even in those early days, mining engineers going to South Wales from the English coalfields remarked upon the "squeeze" of roadways opened underground.

H. Bramwell stated in 1881: "In the English coalfields roads driven in the solid coal or in the undisturbed strata usually stand intact, and roads maintained through excavated areas soon come to a state of rest. The characteristic of South Wales mining is that roads driven in the solid coal or in undisturbed measures do not generally stand intact, and are frequently more difficult and expensive to maintain than roads passing through excavated areas. The whole strata in Wales appears to be under compression, and being comparatively soft, an opening made in it, even of small dimensions, at once commences to squeeze or close up."

OLD COAL LEVEL NEAR TREHAFOD, IN THE RHONDDA VALLEY, SHOWING FURNACE AND CHIMNEY FOR VENTILATION.

From recent experiences at Cwm, Cynheidre, and Abernant, it would appear that "squeeze" was still causing trouble in South Wales pits today, Mr. Simpson commented.

Increased productivity and the economical use of a dwindling manpower would obviously be the industry's main interests in the next few years.

In South Wales he thought they should increase the use of locomotive haulage—diesel powered at first and, when a well-established haulage plane with a future life of over five years had been established, equipped with trolley wire locomotives with 30-cwt. standard mine cars. He felt sure that the use of 3-ton and 6-ton mine cars in South Wales had not been a success. Roadways large enough to accommodate two or three tracks for such large cars, side by side, were too costly and difficult to maintain. The optimum size of roadway in South Wales appeared to be a 12-ft. or 14-ft. standard arch, and at great depths (*i.e.*, over 700 yd.) even these should be supported on circular yielding arches or concrete blocked circular arches. They should plan either to drive their roadways in strata which would stand for the life required (*e.g.*, strata above the 2-ft. 9-in. seam (highest) or below the 5-ft. (second to lowest) seam in the Lower coal measures), or, if that was not possible, to line the roadway so as to withstand all pressures (concrete blocked). For shorter-life roadways or where such expense was not justified, yielding circular steel arches should be used as lining, with 3-in. thick timber cover boarding all round and steel strutted. Repairs and roadway maintenance must be reduced to a minimum—there was no profit from them.

They should make greater efforts to employ hydraulic mining and hydraulic transport in wet mines where the coal was soft enough. In Russia up to 66 tons per manshift had been produced by hydraulic mining, while hydraulic transport (horizontal and vertical) was in use in Polish mines, especially those which were wet and had to pump the water anyway.

Materials handling and transport from surface stockyards to the coal face needed improvement badly in South Wales. The use of mechanical handling devices such as grabs, cranes, forklift trucks, high loaders, shovel loaders, and locomotive or tractor haulage, with palletization where possible, would be necessary. Mono rails or mono-conveyors for underground transport were advocated, though Mr. Simpson had noticed that in pits where a tram or mine car could be taken right to the face, both in the intake and the return, they rarely suffered from ventilation or supply problems.

THE CHILEAN STEEL INSTITUTE reports that between January 1 and March 19 production of steel for rolling was 84,643 tons, compared with 97,247 tons in the same period last year. The reduction is explained by the strike at the Huachipato steel mill in March.

New Literature

SOME of the house magazines, catalogues, booklets, and other publications received are referred to below. Readers wishing to obtain a copy of any of the items should write to the address given, at the same time mentioning this journal.

INSTITUTION OF WORKS MANAGERS, 196, Shaftesbury Avenue, London, W.C.2—Articles on various aspects of safety in industry are included in the July issue of Works Management (2s. 6d.).

FREDERICK BRABY & COMPANY, LIMITED, Braby House, Smithfield Street, London, E.C.1—Interesting articles on the group's activities at home and abroad are included in the June issue of Braby of Britain News.

J. H. FENNER & COMPANY, LIMITED, Marfleet Avenue, Hull—Short, but interesting articles on the company's activities are contained in the V-Belt Journal, the July issue of which is now available. The contributions are written in attractive style, while the general presentation of the magazine is pleasing.

HUNSLET ENGINE COMPANY, LIMITED, Hunslet Engine Works, Leeds 10—The company has recently supplied to British Railways, North-Eastern Region, a 6-ft. and shoulder ballast cleaning machine. This machine, which ensures efficient drainage through the ballast with the minimum of line occupation, is described in report No. 109.

W. C. HOLMES & COMPANY, LIMITED, P.O. Box No. B.7, Turnbridge, Huddersfield—"Holmes-Elex Electrical Precipitators" (publication No. 87) is a comprehensive brochure describing the principle of electrical precipitation and also the practical application of this principle to the many dust-control problems encountered in a wide variety of industries.

RANSOMES & RAPIER, LIMITED, Waterside Works, Ipswich—Two leaflets dealing with self-priming water pumps have been published. Publication No. 2/519 deals with the 6P80 pump, which pumps 80,000 gal./hr. (there are other sizes for 4,000 to 40,000 gal./hr.), while publication No. 7/426 is concerned with the 1½ P4 Mk. II pump, which pumps 4,000 gal./hr.

JOHNSON, MATTHEY & COMPANY, LIMITED, Hatton Garden, London, E.C.1—July number of Platinum Metals Review, a quarterly survey of research on the platinum metals and of developments in their applications in industry, contains articles on "The Platinum Metals in Temperature Measurement," "Platinum-lined Furnaces for Plutonium Production," and various other subjects.

EDGAR ALLEN & COMPANY, LIMITED, Imperial Steel Works, Sheffield 9—"Indexing—Moans by a User" is one of a number of interesting contributions appearing in the July issue of Edgar Allen News. The author is J. F. Hinsley, the company's chief physicist, who presented a paper on the subject at a conference on indexing, arranged by Aslib and the Society of Indexers, held in London in January.

HEAD, WRIGHTSON & COMPANY, LIMITED, Ship House, 20, Buckingham Gate, London, S.W.1—It is the company's custom to send to its shareholders and to others interested a booklet each year which shows briefly in picture form some of the activities and the diversification of its interests. The latest brochure in the series is now available. It is a splendid production and, with the importance of oversea markets well in mind, the captions to the pictures are printed in four languages.

CROMPTON PARKINSON, LIMITED, Crompton House, Aldwych, London, W.C.2—A new leaflet covers the company's A.R. range of shaftless, salient pole, flywheel-type synchronous motors. These motors are suitable for use with a very wide range of compressor designs and are made to BS 2613:1957 continuous maximum rating, the leaflet covering ratings from 100 h.p. to 1,000 h.p. Speeds on 50 c/s supplies range from 237 r.p.m. to 600 r.p.m. unity and leading power factors. Full constructional details are given together with a diagram showing the sectional arrangement of the motor.

ASSOCIATED ELECTRICAL INDUSTRIES, LIMITED, 33, Grosvenor Place, London, S.W.1—Efficient handling of rail freight traffic demands speedy assembly of trains at marshalling yards. The replacement of many small yards by a lesser number of large, mechanized yards is an important aspect of British Railways modernization. The equipment supplied by AEI for the marshalling yard at Margam represents an important step forward in applying automatic controls to yard operation, and hence in increasing the speed and safety of goods in transit. R. M. Foulkes writes on the subject in the June number of AEI Engineering.

GEORGE ANGUS & COMPANY, LIMITED, Angus House, 148-158, Westgate Road, Newcastle-upon-Tyne 1—The company has produced a catalogue showing a small range of industrial safety equipment manufactured by the G.Q. Parachute Company, Limited, Woking (Surrey), the Newcastle company being the sole agents for this equipment. The G.Q. Parachute Company has had nearly 30 years' experience in designing and manufacturing aircraft parachutes of all types, but

COAL NEWS—First Edition

FIRST edition of Coal News, the National Coal Board's new national monthly newspaper, has made its appearance. It is being widely distributed among the 675,000 employees at the 760 collieries, workshops, research stations, and by-products plants.

Coal News contains eight pages and is in newspaper tabloid format. There are separate editions with news and photographs for each of the nine coalfield divisions. The paper costs 3d., half of which goes towards printing costs; the remaining 1½d. is given to a "good cause" chosen by consultative committees.

The first number reports speeches made by Lord Robens, the NCB chairman, and Mr. Sidney Ford, the NUM president, to the NUM conference at Rothesay, and carries a feature article on the prospects for more gas-from-coal plants in Britain. Coal News, which replaces the former Coal Magazine, is up to date with its news presentation, even to the extent of carrying space for "Stop Press."

more recently the company has turned its attention to matters of industrial safety and has produced a range of safety harnesses for use in various industries.

OLD PARK ENGINEERING LIMITED, Holly Hall, Dudley (Worcs)—"Welded Steel Fabrications" is the title of an attractive new brochure. The company, a member of the TI group, is a comparatively new name in steel fabrications. It was, however, originally an integral part of Round Oak Steel Works, Limited, which was established as long ago as 1857. Its original interests were in the repair and maintenance of steelworks' plant; in addition, however, it has now branched out into many other fields and produces gearboxes, bed plates, mining equipment, crusher frames, machine-tool frames, stainless and aluminium fabrications, etc.

STANTON IRONWORKS COMPANY, LIMITED, near Nottingham—A scene in colour on the river Wreake at Asfordby makes a pleasing cover for the June number of the Stantonian (1d.). And who, taking a cursory glance at the picture, would imagine that the scene was but a mile from the company's Holwell Works. The waters of the river, which, in the picture, reflect the ancient stones of the 14th-century church in the village, are used at the works' blast-furnace plant for cooling purposes. Last March, the Stanton coke-oven plant completed 21 years' production, and an article outlines the function and development of the plant. The author is R. Neumann, superintendent, coke marketing and by-products.

BRITISH TRANSPORT COMMISSION, Public Relations Department (Room 320), 222, Marylebone Road, London, N.W.1—The "most massive modernization scheme of any kind undertaken in this country during the present century," is how the work of modernizing and re-equipping Britain's railways is described in a new booklet, "Modernization Progress Report." The modernization plan was launched just over five years ago and, as well as reviewing the introduction of new diesel and electric trains and the building of new passenger stations, the booklet gives an interesting insight into what is being done behind the scenes—how track, for example, is being improved by the laying of long-welded rails to give smoother running, how new power-operated signal boxes are helping to accelerate the movement of traffic, and how new automatic marshalling yards are speeding up freight operations.

NATIONAL INSTITUTE OF INDUSTRIAL PSYCHOLOGY, 14, Welbeck Street, London, W.1—Designing machinery without enough thought for the worker who will operate it can lead to low morale and to waste of time and money in re-engineering. But planning equipment so as to avoid fatigue and error on the part of the operator requires team work in which the psychologist should play an important part. These are among the conclusions of an article in the current (January and April) issue of Occupational Psychology. A systematic approach to machine design, it suggests, is even more important now that automation is freeing the operator from many manual tasks, but making accuracy and consistency in control much more important. In another article, "Industrial Fatigue," it is stated that, in the iron and steel industry, reduction of hours from 12 to eight per shift caused little increase in output for men on pig-iron production and steel rolling. However, for those on open-hearth steel production, reduction from 12 to eight shift hours caused an increase in total output of 9 per cent. at one works and 2 per cent. at another. During 16-hr. shifts, which occurred once in three weeks in pig-iron production, rate of work was 8 to 15 per cent. less than in 8-hr. shifts.

GKN House—

A NEW LONDON LANDMARK

ON the site of the old Stoll Theatre at 22, Kingsway, GKN House is a new landmark among the modern office blocks of London. This seven-storey building with 92,000 sq. ft. of office accommodation furnished and equipped in the most modern style has two basements for car parking.

Until last year the London address of the Guest Keen & Nettlefolds group of companies was 66, Cannon Street, E.C.4, where only a limited number of representatives of group companies were

THE GKN GROUP'S NEW HEADQUARTERS IN KINGSWAY, LONDON, W.C.2.

housed, other companies having offices in many different parts of London. The directors have now achieved their wish of bringing together in one building all existing London offices. GKN House has been designed so that it will retain its modernity in years to come. Approximately 500 employees are housed in the building, which is equipped with showrooms and a cinema and lecture theatre accommodating 50 people. GKN House is 248 ft. long, 90 ft. wide, and 180 ft. high.

Edgar Allen in Australia

Edgar Allen & Company, Limited, the Sheffield steelmakers, has formed an Australian subsidiary, Edgar Allen & Company (Australia) Pty., Limited, at 148, Thistlethwaite Street, South Melbourne, Victoria. New premises will be built next to the heat-treatment plant in South Melbourne and a new factory will be built later on a site to be chosen. The company will arrange for local manufacture and sale of the parent company's products and develop the heat-treatment plant and hobbing facilities.

Rapid Desulphurization in Basic Electric Steelmaking

Steel can be quickly desulphurized to low levels by the direct injection of powdered desulphurizing reagents into the metal bath of a basic electric arc furnace.

REFINING period in the electric arc furnace, that is, the time in which the molten metal is held under a white reducing slag for sulphur removal, is also the time when the hydrogen content of the steel can increase to undesirable leve's.

For very low sulphur steels extremely long refining times are normally necessary. It is possible, however, to speed up this process and so reduce the danger of hydrogen contamination. BISRA's Steelmaking Division has carried out a number of experiments in which powdered desulphurizing reagents were injected directly into the metal bath of an electric arc furnace to bring about rapid sulphur removal.

The experiments were divided into two groups.—(1) Injections into the metal with only a minimum of slag present, leaving the reaction products to form a new slag on the surface of the metal; (2) injections under a white reducing slag.

The injections under a minimum of slag were carried out to show the degree of desulphurization obtainable with a particular reagent, and the injections under white reducing slag were carried out so that the rate of desulphurization with each reagent could be measured. The powdered reagents used for these experiments were burnt lime, burnt lime plus carbon, calcium cyanamide, calcium carbide, Raremet Compound No. 5, calcium silicide, and calcium silicide plus burnt lime. Mixtures of these, together with either powdered aluminium or magnesium, were also injected.

For the injection under a minimum of slag, the metal bath was put under a white reducing slag in a 10-cwt. electric arc furnace until the sulphur concentration of the metal was reduced to approximately 0.015 per cent. Then the slag was removed almost completely and the desired quantity of powdered reagent, with or without deoxidizer, injected into the bath through ¼-in. Class C tubing with oxygen-free nitrogen as the carrier gas. The reaction products from the injection were left on the surface to form a new slag. A British Oxygen Gases powder dispenser was used for the injection. In each experiment the lancing was divided into several parts so that the course of the reaction could be determined.

For the injections under slag, the metal bath was put under a white reducing slag in the electric arc furnace. Metal and slag samples and temperatures were taken at regular intervals so that the rate of desulphurization for the slag could be determined.

The desired quantity of powdered reagent was then injected and a metal sample, a slag sample, and a temperature reading were taken as soon as each injection was complete. The materials used for these injections were calcium-silico-magnesium, calcium-silico-manganese, calcium silicide, and burnt lime plus magnesium powder.

The results of the two series of experiments show that steel can certainly be rapidly desulphurized to low levels by the injection of powdered reagents; but for quick desulphurization to very low levels the metal must be strongly deoxidized either by previous treatment—for example, with aluminium—or by the injectant containing magnesium or aluminium either as an alloy or as an element. Magnesium powder can be safely dispensed when it is suitably diluted with other powdered materials.

Reproducible sulphur values of approximately 0.005 per cent. were obtained by the injection of calcium carbide or calcium cyanamide into aluminium deoxidized metal baths and also by the injection of mixtures of calcium carbide, calcium cyanamide, or burnt lime with magnesium powder into ferro-silicon deoxidized baths under the minimum of slag.

The most rapid desulphurization to very low sulphur levels under white reducing slag was achieved when burnt lime with magnesium powder mixtures and calcium-silico-magnesium were used as the injectants. The rate of sulphur removal during these injections varied from 0.003 per cent. to 0.007 per cent. per min. Negligible change was found in the sulphur concentration of the treated metal on tapping.

Wire Rope Fatigue Problems

An international conference on wire rope fatigue will be held in Turin from September 7 to 10 in conjunction with the celebrations of the centenary of the Italian Unity. The conference will be sponsored by the Experimental Laboratory for Building Materials of the Turinese Polytechnic School. The conference programme includes visits to testing laboratories, installations, and firms in the area.

Fall in ECSC Steel Orders

SITUATION in the steel market of the European Coal and Steel Community will be "not unsatisfactory" in the third quarter of the current year, according to the estimate issued in Luxembourg by the ECSC High Authority. Deliveries since February have been running at a higher level than new orders received. Total orders have fallen from 13,200,000 metric tons at the end of January to 12,000,000 tons at the end of May. Inland demand is expected to become stable, while consumers' stocks fall "relatively." The heavy orders received from non-ECSC countries in May are not expected to continue into the third quarter.

Community steel consumption is set at 15,200,000 tons for the period and exports at 3,800,000 tons. Estimating imports at 500,000 tons, production of 18,500,000 tons is seen as necessary, compared with 18,730,000 tons in the last quarter. Only West Germany is expected to produce more steel than in the second 1961 quarter, with some 8,700,000 (8,420,000) tons.

About 705 kg. of pig-iron is expected to be used per metric ton of steel produced over the period. Pig-iron demand in the ECSC area is put at 13,050,000 tons, and estimated production at 13,900,000 tons. Total coke demand is estimated as 12,750,000 tons, and scrap requirements will be of some 8,200,000 tons.

The High Authority expects coal output to fall over the period in the Ruhr, Saar, South Belgium, and France, and rise in the Aix-la-Chapelle and Limburg coalfields, producing a fall of 1,400,000 tons or 2.5 per cent., compared with the third 1960 quarter. Total ECSC production is estimated as 55,910,000 tons, less 250,000 tons lost-shift decrease. Imports from non-ECSC countries are put at 5,120,000 tons, and exports at 880,000 tons. Stocks are expected to fall by 300,000 tons to 29,300,000 tons.

West Germany, the main coal producer in the Community, will produce an estimated 34,600,000 tons in the quarter. Total demand is expected to fall by 1.5 per cent. within the ECSC, despite a 4 per cent. increase in power station requirements, and steady working in the ferrous metals industry.

CZECH PLANS TO INCREASE OXYGEN STEEL OUTPUT

ABOUT 37.3 per cent. of all Czech fine steel production will be from oxygen converters by 1975, it is announced from Prague. At present only electric furnaces and Martin furnaces are used for this production, accounting for 53.5 per cent. and 46.5 per cent. of total output respectively.

It is also stated that the East Slovakian ironworks plant at Kosice, which is to start production of pig-iron in 1964 and of raw steel in 1965, will by 1970 have an annual capacity of 4,000,000 metric tons of steel—almost two thirds of the 1960 Czech production.

IN THE WORLD'S worst colliery disaster this year, fire killed 108 miners at Dukla Colliery, Czechoslovakia, last Friday. The fire is said to have been caused by an explosion underground about 400 yds. from the pithead. The mine is in the Ostrava Karvina coalfield, where an explosion at the Hlubina pit killed 54 miners in May last year. On behalf of the National Coal Board, a message of sympathy has been sent to the Czechoslovakian Embassy by Lord Robens.

Tinplate Works Return to Capacity Output

TINPLATE works in Britain are again working at full capacity. Overstocking in the canning industry forced producers to reduce output earlier this year, but a spring revival has continued. The change comes at a time when both the Steel Company of Wales, Limited, and Richard Thomas & Baldwins, Limited, have announced the opening of new electrolytic lines. Between them, the two companies supply nearly all the UK tinplate.

Current average production is about 20,000 tons a week, about three quarters of which is by electrolytic methods and the other quarter (rapidly diminishing), by the old hot dipped system. Both RTB and the SCOW new lines are capable of about 5,000 tons a week. This means that SCOW's potential electrolytic production is increased from about 16,000 tons a week to 21,000 tons, and RTB's from 1,500 to 6,500 tons.

Total SCOW production for the year ending September, 1960, was 891,000 tons. Both differential plating and automatic testing, now being used by RTB, are SCOW developments.

Allen West Acquires Digital Engineering

SPECIALISTS for more than 50 years in the manufacture of electric motor control gear and switchgear, Allen West & Company, Limited, Brighton, is to branch out into new fields of control embracing digital techniques developed over the past five years by the Digital Engineering Company, Limited, London, S.W.11, whose manufacturing interests have been acquired by Allen West. Digital Engineering will operate as a subsidiary of the main company.

Dr. L. N. Bramley, who has been managing director of the London firm since it started in 1956, takes up a full-time appointment in the same capacity on September 1 and Mr. W. N. Jenkins, the other original director of the company, remains as consultant. Mr. G. H. Cann becomes chairman. Joining the board of the subsidiary company from Allen West are Mr. V. Laurence Breeze, deputy managing director, Mr. J. Meares, secretary, and two senior engineers, Mr. J. R. Stacey and Mr. F. W. White.

STEWARTS AND LLOYDS TO CLOSE TUBE MILL

CLYDESDALE No. 2 mill of Stewarts and Lloyds, Limited, at Bellshill, near Glasgow, is to be closed temporarily from the end of this week. The company stated last week that this step would have to be taken because of "the current shortage of orders from the oil industry." About 800 men will be affected.

The plant is one of Stewarts and Lloyds' four Scottish tube mills, and it works almost exclusively on pipes and equipment for the oil industry.

THE MINERAL RAILWAY between the Emma and Stargate collieries (Co. Durham) is to be closed by the Durham Divisional Coal Board, and road transport is to be used for coal haulage because it is cheaper. The line was laid 50 years ago.

Coke-saving Methods

FRENCH BLAST-FURNACE PROCEDURE

From Our Special Correspondent

RESEARCH work directed to the reduction of consumption of coke in blast furnaces has now been going on in the French steel industry for many years. While for a time the main incentive to those efforts was the relative shortage of home coking coal, improvement of productivity of blast furnaces has become more and more predominant in this field, as every reduction of coke consumption per ton of pig-iron results in a more than proportional rise of production.

Although the attention of French technicians has been mainly directed to the saving in metallurgical coke entailed in the partial enrichment of ore by hot agglomeration, it has also been attracted by other means of action with equally important thermal results and involving a smaller capital outlay. This applies in particular to improvement of coke quality; stabilization of the coke, the agglomerate, and the ore; increased temperature of the blow; high top-pressure; injections of hydrocarbons, and slag acidity.

Considerable progress has been made in improving the quality of coke—in Eastern France by the use of original processes for preparing coke paste; and in Northern France by general improvement in coking methods. So far, no appreciable reduction of consumption has been achieved as a result, but, nevertheless, these advances have brought about an extension of the range of coking coals—an important factor in balancing the country's energy resources.

Stabilization of Coke

The technique of the stabilization of coke also justifies the expectation of promising results on these two aspects of coal and coke economy. It consists of charging coking ovens with cheap coal of poor coking quality. This yields coke with little cohesion which is then subjected to methodical degradation. In this way the necessary proportions of excellent blast-furnace coke and fines for sintering plant are obtained.

Over the past few years all French iron and steel works have been following the general world tendency to increase the size of blast furnaces. At the moment, 15 blast furnaces have a hearth diameter of 21 ft. 4 in. to 24 ft. 7 in., while five furnaces with hearths over 26 ft. 3 in. will soon be either in operation or under construction.

Several blast furnaces are equipped with Cowper ovens supplying blast air at a temperature of more than 1,832 deg. F. (1,000 deg. C.). This technique of the use of very hot air is being more and more widely adopted, especially as it is combined with that of injecting hydrocarbons. In five blast furnaces this latter process very quickly emerged from the experimental to the practical industrial stage in 1960. The favourable results obtained (a reduction of 10 per cent. in consumption of coke) will doubtless promote rapid extension of injections of natural gas, light and heavy fuel oils, coke oven gas, and powdered coal.

There are two schools of thought on the subject of using agglomerate: the agglomerate can either be distributed more or less uniformly in the charges of all the blast furnaces of a given plant, or, conversely, the whole of the agglomerate can be charged in some of the furnaces, the others being charged with the crushed and screened ore. In recent years numerous tests of variable duration have been made along both lines with a view to establishing the factor on the basis of which each company must make its decision. Several works are preparing to agglomerate the whole of their ores, and the technique of overall agglomeration is to be put into practice in the near future in one plant, then in two others.

At the present time, production of agglomerate is constantly increasing. At the beginning of 1961, it had reached an annual rate of 6,000,000 tons and this will be brought up to 24,000,000 tons by the completion of the fourth modernization plan, in 1965. Finally, tests have been going on for several years or are now being undertaken in connection with low basicity slags, pig-iron granularity, coke and agglomerate classification, and special refractory linings for blast-furnace shafts.

All this has already resulted in a substantial reduction of coke consumption per ton of pig-iron. Consumption, which was of about 1,033 kg per metric ton in 1957, went down to 972 kg in 1960 (a reduction of 5.9 per cent.) and is expected to decrease further to 850 kg—or even less—in 1965.

European Computer Manufacturers' Association

WITH headquarters and secretariat in Geneva, a European Computer Manufacturers' Association has been established to further the adoption of data processing standards for the benefit of users, the public, and the industry itself. To secure inter-company co-operation throughout the industry, efforts are to be made towards the establishment of systems and equipment compatibility and the development of common systems languages.

The first president of ECMA is Mr. C. G. Holland-Martin, research director of International Computers & Tabulators, Limited, and British member-companies include Associated Electrical Industries, Limited, Elliott Bros. (London), Limited, the English Electric Company, Limited, Ferranti, Limited, and Leo Computers, Limited.

Mining Qualifications Board

NEXT Mining Qualifications Board examinations for first and second class certificates of competency as managers and undermanagers of mines will be held November 14, 15, and 16, 1961, at Glasgow, Sunderland, Doncaster, Wigan, Cardiff, and Stoke-on-Trent. Candidates for limited certificates of competency as managers and undermanagers of stratified ironstone mines will attend at the Doncaster centre.

The Mining Legislation examination for mechanical engineer's certificates, electrical engineer's certificates, mechanic's certificates Class I and electrician's certificates Class I will be held at the above centres on November 14, 1961. The written part of the examination for certificates of qualification as surveyors of mines will be held at the above centres on November 15, 1961, and the oral and practical examination in January, 1962.

Holders of the Higher National Certificate in mining surveying, or applicants who have passed the intermediate examination of the Royal Institute of Chartered Surveyors and are, therefore, exempt from the written examination must submit their applications not later than September 20, 1961. Intending candidates should apply after August 21 for the necessary forms, stating whether they have previously attended an examination for any of the above certificates.

The completed applications should be returned to the secretary as soon as possible, and must in any event be received not later than September 20, 1961. Letters should be addressed to the Secretary, Mining Qualifications Board, Ministry of Power, Thames House South, Millbank, London, S.W.1.

The Mining Qualifications Board states that in future holders of approved mining degrees or diplomas, or the National Diploma in Mining, or associate members, by examination, of the Institution of Mining Engineers, who apply for a first class (managers) certificate of competency under Part III of the Mining Examinations (Certificates of Competency) Rules, 1952, will be required to qualify only in the subject of mining law.

PARLIAMENTARY SECRETARY AT SMOKELESS FUEL TEST PLANT

AFTER touring Birch Coppice Colliery, near Polesworth (Staffs) recently to see the progress being made in the development of a new type of smokeless fuel, Mr. J. C. George, Parliamentary Secretary to the Ministry of Power and chairman of the National Advisory Committee on Smokeless Fuel, said: "This is a real drive by the National Coal Board to make the Clean Air Act a reality."

Mr. George said the reactor had been proved successful. It now remained to be proved that briquettes could be made at high output speeds.

CEYLON GOVERNMENT has signed a contract with Tiajproexport, of Moscow, for the supply of plant, machinery, construction materials and working drawings for stage one of a proposed iron and steel works.

Recent Wills

JAQUEST, J. H., former Group electrical engineer, East Midlands Divisional Coal Board £3,197

BURGESS, JOSEPH, for over 30 years shotfirer, deputy, and overman at Dinnington Colliery (Yorks) £2,276

LLOYD, C. A., for 33 years a director of Stewarts and Lloyds, Limited, steelmakers, etc., of Glasgow £104,932

BAIRD, M. B., retired director of Archibald Baird & Son, Limited, colliery engineers, of Hamilton (Fife) £37,839

LLOYD, J. C., a director of Stewarts and Lloyds, Limited, and a descendant of the founder of Lloyds, Limited £116,007

LEACH, CHARLES, managing director of John Holding & Company (1955), Limited, forging manufacturers, of Sheffield £95,125

ROBBINS, W. G., director of Wilfred Robbins, Limited, structural engineers and steel stockholders, of Great Bridge, Tipton (Staffs) £164,126

RAWORTH, E. L., chairman and joint managing director of McCall & Company (Sheffield), Limited, and McCall's Macalloy, Limited ... £53,464

KENWORTHY, HERBERT, for over 40 years chief buyer with the Lilleshall Company, Limited, engineers and implement manufacturers, of Oakengates (Salop) £7,542

RHODES, MARK, proprietor of C. E. Rhodes & Sons, civil and mining engineers, of Rotherham, and consultant for several collieries in this country and oversea £56,892

BOOCOCK, G. W., for a number of years a director and company secretary of Plowright Bros., Limited, makers of coal preparation plant, etc., of Chesterfield £4,792

CROMPTON, THOMAS, former managing director of Thomas Crompton & Sons, Limited, manufacturers of hinges, locks, etc., of Ashton-in-Makerfield (Lancs) £129,436

SJOGREN, JUSTUS, chairman of Sandvik Swedish Steels, Limited, and Sandvik Steel Band Conveyors, Limited, and pioneer of the Swedish Sandvik organization in Britain £110,225

JAMES, HON. ROBERT, chairman of Barnsley District Coking Company, Limited, and Barrow Barnsley (Holdings), Limited, and formerly of Barrow Haematite Steel Company, Limited £16,560

SMOUT, SIR ARTHUR, eminent metallurgist and industrialist, chairman of Murex, Limited, and former chairman of what is now the metals division of Imperial Chemical Industries, Limited £62,281

BIRKS, C. D., gas engineer, founder and former chairman of Abbott, Birks & Company, Limited, makers of tools and appliances for gas, water, and electrical undertakings, of London, S.E.1 ... £68,735

MADDOCKS, L. T., chairman of the Phoenix Steel Tube Company, Limited, West Bromwich (Staffs), which he founded in 1930, a director of Connaught Engineering Works, Limited, and Senior Economisers, Limited £226,656

DUNCALFE, SIR ROGER, chairman of British Glues & Chemicals, Limited, vice-president of the Federation of British Industries, past-president of the British Standards Institution, and deputy chairman of the Beaver Committee on Air Pollution £130,484

INTESTATE

MILLS, T. E., a director of the Stenton Engineering Company, Limited, Sheffield £9,085

MINSHALL, W. C., construction engineer with John Summers & Sons, Limited, steelmakers, of Shotton (Ches) £26,800

HOPKINS, JOHN, conference and consultative secretary of No. 9 (Neath) Area of the South-Western Divisional Coal Board, and formerly secretary of Amalgamated Anthracite Collieries, Limited £2,346

Loan for New India Tube Factory

LOAN of £175,000 sterling is to be provided by the Commonwealth Development Finance Company for the manufacture of non-ferrous tubes, pipes, rods, and sections, in India. The loan will provide the foreign exchange requirement of the factory being erected in Bombay by Kamani Tubes, Private, Limited.

The venture has been made in collaboration with Yorkshire Imperial Metals, Limited, an associate of Imperial Chemical Industries, Limited, which has arranged the procurement of plant in the UK and will assist in the running-in period under a 10-year technical collaboration agreement.

Obituary

MR. EBBY EDWARDS

A Distinguished Leader of the Miners

FORMER miners' leader who played an important part in the nationalization of the coal industry, Mr. Ebby Edwards died at his home near Newcastle-upon-Tyne on Thursday of last week at the age of 76. In a life dedicated to miners and mining, Mr. Edwards started at the coal face before he was 12, became president and then for 14 years general secretary of the Miners' Federation of Great Britain, later the National Union of Mineworkers. He served for seven years on the National Coal Board, to which he was appointed in 1946.

Mr. Edwards was born in 1884 at the mining village of Chevington, Northumberland, one of a family of 11 children. He went down the pit just before his 12th birthday, and at 23 won a miner's scholarship to Ruskin College, Oxford. Returning from the college to the coal face, he rose to the presidency of the Northumberland Miners' Association and afterwards became its financial secretary.

In 1929 he became Socialist MP for Morpeth but lost the seat in the landslide of 1931. During his short Parliamentary career he became, at only 47, president of the Miners' Federation of Great Britain.

President of TUC

Mr. Edwards stayed in the forefront of the British trade union movement for the rest of his working life. In 1932 he became general secretary of the MFGB and held that position for 14 years, during which time the organization underwent a profound change. In 1944 it was renamed the National Union of Mineworkers.

Among many appointments he held was that of secretary of the International Mineworkers' Federation, of which his son, Mr. Dennis Edwards, is now assistant secretary. During the war, he was offered the post of Director of Labour at the Ministry of Fuel and Power, but declined it after consultation with union colleagues. He was president of the TUC from 1943-44, and afterwards TUC chairman.

During the war he weighed into the campaign to raise coal production and in 1942 became a member of the advisory board for the industry to the Government. The various crises in the industry during the war, however, seemed to him to strengthen the case for nationalization, and in 1941 he prepared a memorandum calling for nationalization. After the war, when nationalization came, he accepted a seat on the National Coal Board as member for labour relations. He retired in 1953.

MR. EDWIN HALL

NINE months after his retirement as Lancashire Area secretary of the National Union of Mineworkers, Mr. Edwin Hall died at his Bolton home last Saturday. He was 65. Mr. Hall, who started work as a haulage boy at 10d. a day when he was 13, was miners' agent for the St. Helens district when he was appointed vice-president of the old Lancashire and Cheshire Miners' Federation in 1942. He succeeded to the presidency in January, 1944, and the following year he became secretary of the Lancashire Area of the NUM.

He was sometimes known as "the pocket dynamo of Lancashire miners," but he used his vigour to restrain his own members as well as to fight their cause with the employers, and later, the National Coal Board. His sense of responsibility and courage were seen to particularly good advantage in 1947, when, virtually single-handed, he ended a damaging unofficial strike at Mosley Common Colliery, near Manchester.

MR. GEORGE E. SANDLAND

THE death took place suddenly on Saturday of Mr. George Sandland, for 35 years with the International Nickel Company (Mond), Limited. Trained as an engineer designer with Vickers-Armstrongs, Limited, he was one of three who reorganized the development and research department of International Nickel. He saw the first issue—and many subsequent issues—of the Nickel Bulletin through the press and played a prominent part in its establishment as a valued contribution to metallurgical literature.

During the war he worked in the development and research department in the company's London office and after the war rejoined the publicity department. Latterly he had been prominent in the Nickel Plating Labelling Scheme.

Mr. JOHN FRYER STAMP, who was for over 50 years in the service of the Fairfield Shipbuilding & Engineering Company, Limited, Glasgow, and for about 25 years was chief ship draughtsman, has died at the age of 80.

Mr. LEWIS G. WHITELEY, who died last Saturday at the age of 68, was managing director of William Newsome & Son, Limited, engineers and machinery merchants, of Sowerby Bridge (Yorks), and a former member of the Council of the British Association of Machine Tool Merchants.

Sir PHILIP BARBER, a partner in the Eastwood (Nottinghamshire) firm of Barber, Walker & Company,

Limited, colliery owners, before nationalization, died on Wednesday at his home at Eastwood aged 85. He was a member of Nottinghamshire County Council for 63 years, and chairman from 1932 to 1946.

Consulting director of CAV, Limited, electrical and fuel injection equipment makers, of London, E.C.1, Mr. EDMUND LATHAM CADWALLADER died on Sunday at the age of 78. He had been with the company for 50 years, and was joint general manager from 1933 until his retirement from active duties in 1953.

Chairman of the Goodyear Tyre & Rubber Company (Great Britain), Limited, for many years until his retirement early last year, Mr. A. S. BISHOP died on Monday. He joined the firm in 1916, became head of the commercial tyre department in 1933, and three years later joined the board as sales director. He remained on the Goodyear board as a director after his retirement.

The death occurred on Thursday of last week, at the age of 91, of Mr. GEORGE OWEN DONOVAN, who founded the Donovan Electrical Company, Limited, Birmingham, 52 years ago. Founder member of the Electrical Wholesalers' Association and a member of the Association council from 1914 to 1935, he helped to establish the Birmingham Electric Club and was its president in 1910. He was also the club's senior honorary life vice-president.

TIN COUNCIL SEEKS RELEASE OF METAL BY US GOVERNMENT

THE International Tin Council has informed the US administration of its desire to enter into consultations regarding disposals from the US strategic stockpile of tin, the Council announced in London last week. The statement was made at the conclusion of the first meeting held by the Council under the Second International Tin Agreement, which came into operation two weeks ago.

The Council has decided, in principle, to retain its buffer stock, even though this no longer holds any tin. It noted, however, that in present circumstances it would not be appropriate to require that any part of the buffer stock of the Second Tin Council should be contributed in tin metal.

It had therefore been agreed that contributions should be made entirely in cash by the participating producing countries. The amount so contributed is £14,600,000, the equivalent of 20,000 tons of metal calculated at the present floor price in the agreement of £370 a ton.

The Council stated that the first meeting had adjourned and that it would resume its consideration of prices on August 22.

"Workers in Need of Status"

EMPLOYERS should see that workers receive both status and respect if they want to reduce labour turnover, Dr. A. B. Badger, industrial relations officer to the Gas Council, told managerial representatives at a London conference on the cost of labour turnover, organized by the British Institute of Management. He said management must bear in mind that most people do not look at wages and salaries as the be-all and end-all of existence.

Mr. R. K. Bremner, internal consultant, Richard Costain, Limited, who dealt with turnover of clerical and secretarial staff, said: "There is ample proof that, in the ultimate, whatever the job, whatever the conditions, people work for people."

Board Changes

DUCTILE STEELS, LIMITED—Mr. C. J. Baker has been appointed an additional director.

R. & A. G. CROSSLAND, LIMITED—Mr. A. G. Crossland has been appointed managing director.

CHARLES W. TAYLOR & SON, LIMITED—Mr. Christopher Nicholls has been appointed a director.

ABERDARE HOLDINGS, LIMITED—Lt.-Col. L. A. M. Bates-Oldham has retired from the board for health reasons.

GEO. SALTER & COMPANY, LIMITED—Mr. David H. Bramley has been appointed production director. He succeeds Mr. P. P. C. Drabble in August.

TURBINE GEARS, LIMITED—Mr. F. J. Sullivan has been appointed a director of the company, a member of the Simon Engineering Limited, group.

PEGLERS, LIMITED—Mr. Ernest Webster and Mr. John W. Emberton have been appointed directors to fill the vacancies caused by the resignations of Mr. W. Wicks and Mr. A. E. Emberton.

YALE & TOWNE MANUFACTURING COMPANY—Mr. John T. McCarley has been appointed managing director of the British division of the US company, in succession to Mr. John O. Sewell, who has resigned.

EDWARD G. HERBERT, LIMITED—Mr. Chas. E. Rogerson has been elected vice-chairman and Mr. V. M. Marshall is appointed a director. Mr. Alan Kiernan and Mr. Sam Smiley have retired from the board.

GENT & COMPANY, LIMITED—Mr. J. R. Bulman, works manager, and Mr. E. O. Chapman, sales manager, have been appointed to the board. Mr. Bulman joined the company in 1928 and Mr. E. O. Chapman in 1926

BERRY'S ELECTRIC, LIMITED—Mr. P. J. J. Roberts has been elected a director. Mr. W. A. May has been elected a director of the subsidiary, Berry's Electrical Magicoal, Limited, while retaining his position as secretary of the company.

HARGREAVES (LEEDS), LIMITED—Mr. Herbert Robinson is to join the board following the company's purchase of the share capital of Smith & Robinson (Leeds), Limited. He will continue as joint managing director of Smith & Robinson.

EVERSHED & VIGNOLES, LIMITED—Mr. C. M. Vignoles, who recently retired as managing director of Shell-Mex & BP, Limited, has been appointed chairman in succession to Mr. J. C. Needham, who recently retired from the board.

GEORGE COHEN, SONS & COMPANY (AUSTRALIA) PTY., LIMITED—Mr. J. P. Bolton has been appointed managing director in succession to the late Mr. C. A. Bell. The company is the Australian subsidiary of the George Cohen 600 Group, Limited.

TEES SIDE BRIDGE & ENGINEERING WORKS, LIMITED—Mr. J. C. Hall and Mr. E. P. Gallagher have been appointed directors. Mr. Hall is at present chief engineer and Mr Gallagher is personal assistant to Mr W. L. Fletcher, managing director.

CONSOLIDATED ZINC CORPORATION, LIMITED—Mr. A. M. Baer, deputy chairman, having reached retirement age, is resigning from his executive positions with the subsidiary companies of the group, but will continue to be deputy chairman of the parent company.

BRITISH INSULATED CALLENDER'S CABLES, LIMITED—Mr. C. O. Boyse, on relinquishing his appointment as managing director of the Automatic Telephone & Electric Company, Limited, has been appointed an executive director of BICC. He has been a member of the BICC board since 1956.

IRON AND STEEL TRADE

SLOWING down in the demand for most types of both heavy and light steel products is now being felt more at the melting shops and rolling mills. During the past week or so steel furnaces have been closed by both South Durham Steel & Iron Company, Limited, and Dorman, Long & Company, Limited, and, in some cases, there has been an extension of short-time working at rolling mills producing structural shapes, and at a new plate mill and a slabbing mill. But for the incidence of holidays and the consequent laying-off of plant, weekly working schedules in some sections of the industry might have been reduced by more than the two or three shifts already announced.

Pig-iron

The engineering and speciality foundries continue to obtain fairly substantial outputs of high-duty castings and their consumption of pig-iron is at high levels. The principal call is for low phosphorus irons, but good quantities of hematite are being taken up.

All grades of pig-iron are plentiful with most producers holding tonnages to spare. Basic steelmaking pig-iron comprises the major portion of production, but the majority of makers have capacity available and are continuing to export a fair amount of their output.

Ferro-alloys

A quieter tendency persists but overall demand is reasonable. Ferro-silicon is fairly well supported, and ferro-chrome is receiving steady attention. Demand for ferro-manganese and silico-manganese is at a good level.

Ferro-titanium and ferro-niobium are still quite active; there is a fair demand for chromium metal, but silicon metal is rather slow moving.

Semi-finished Steel

The re-rollers could undertake much more business than is at present arising, those dealing with small bars and light sections finding it extremely difficult to obtain sufficient business to make up full rollings. In many instances work on hand will only maintain production for a short time ahead. Additional business is also required for strip and bright drawn bars.

Fresh business for steel semis is only being placed as stocks on hand at the re-rolling mills are used up. The supply of alloy and carbon steel semis continues to show improvement. Arisings at the steelworks of suitable defectives and crops continue to be in demand by the re-rollers.

Finished Steel

The position is somewhat erratic with some works being fully booked and having to sublet parts of contracts in order to maintain delivery dates while others have difficulty in securing sufficient business. Overall, the demand is below capacity and most steelworks are having to include more sections in the weekly rollings in order to keep output at the present level.

Capacity is available for cold reduced sheets and strip and flat and galvanized sheet and additional orders could be included. Orders for structural steelwork are keenly competed for so that both prices and delivery dates are down to the bare minimum.

MIDLAND SILICONES, LIMITED—Mr. A. K. Simcox, Mr. J. S. Hughes, and Mr. H. N. Fenn have been appointed to the board.

Fall in Iron Ore Imports Through Welsh Ports

IMPORTS of iron ore through the South Wales ports in the first six months of the year fell by 221,207 tons to 2,028,019 tons, while those of other ores increased by 51,974 tons to 181,784 tons. Imports of iron and steel goods were also down by 28,145 tons to 122,333 tons, and imports of pitwood declined by 6,607 tons to 51,205 tons.

Exports of iron and steel manufactures rose by 88,713 tons to 286,220 tons, while the next largest rise in exports was in coal and coke, which was up 77,257 tons at 1,287,824 tons. Of this, 621,893 tons went to foreign destinations, against 534,153 tons a year ago. In contrast to this, exports of tinplate dropped by 40,032 to 207,666 tons.

Total trade passing through the various ports in the six months period (with the figure for the corresponding period last year in parentheses) were:—Newport, 1,137,265 (1,087,645) tons; Cardiff, 1,068,382 (1,039,402) tons; Barry, 611,591 (593,258) tons; Port Talbot, 1,537,398 (1,654,924) tons; Swansea, 2,812,113 (3,723,149) tons; Penarth, 152,325 (188,661) tons; Lydney, 12,842 (13,932) tons.

Ore Chartering

FEATURE of interest has been the active market from Marmagoa to Japan and tonnage, mostly about 10,000 tons, with loading dates during July and September/October have all been fixed at 50s. f.i.o. and trimmed. Tonnage has also been fixed from Marmagoa to Piombino, Bagnoli and Civita Vecchia at 40s. f.i.o., 9,800 tons, August 1/20, and 9,500 tons to Rijeka or Trieste at 41s. 9d. f.i.o., July/August loading.

The ore trade from North Africa is quiet with very little quoting to the Continent and nothing on the open market for UK discharge. No fixtures have been recently reported and this position also applies from the Swedish ore ports and Narvik, again both to the UK and Continent. There is a moderate inquiry from West Africa and it is reported that Pepel to the Continent paid 28s. for forward loading.

In the phosphate section, Casablanca/China paid 68s. 6d. for 14,000 tons, August 1/20, and a 6,700 tonner for July loading has been fixed from Saffi to Brake at 22s. on gross terms. There is some inquiry to the UK. Morphou Bay pyrites to West Coast UK reports 8,000 tons for late August at 40s. and 9,500 tons from Vassiliko Bay to Rotterdam at 26s. gross terms, for July 10/25, and from Huelva a 3,000 tonner has been taken for Rotterdam at 21s. for prompt loading.

Coalfield News

Under-sea Coal Reserves of 300,000,000 Tons

RESERVES of coal totalling £300,000 tons lie under the sea off the coast of Co. Durham. This has been proved by tests made from the National Coal Board's off-shore boring tower which has been operating since 1958 between the Tyne and the Tees.

Twenty seams have been revealed in the tests, workable ones being between 2 ft. 6 in. and 8 ft. thick.

MINERS AT Barnburgh Main Colliery (Yorks), who had been on strike over a wages dispute since Thursday of last week resumed work on Monday.

TWO MINERS were rescued after a dirt fall underground at Binley Colliery, near Coventry, on Tuesday night. One of the men, a deputy, Mr. Andrew Baxter, was trapped for about an hour.

MINER, Mr. Geoffrey Roberts (29), was killed when an automatic coal-cutting machine, which he was driving underground at Glapwell Colliery, hit a supporting beam which catapulted back at him.

COAL AND COKE shipments through the port of Garston during June were (in tons): Northern Ireland: coal 59,382; Eire: coal, 17,299; Isle of Man: coal, 2,960; coke, 311; foreign: coke, 1,724; other coastwise bunkers: coal, 137.

COAL AND COKE shipments from the River Wear during May amounted to 188,116 tons, an increase of 3,769 tons on the previous May. The total for the first five months of the year was 991,745 tons, a decline of 37,637 tons on 1960.

WINNERS OF THE divisional trophy, collieries section, at the 10th annual fire-fighting competition of the North-Eastern Divisional Coal Board, were No. 6 (North Barnsley) Area. Divisional production director, Mr. C. Machin, presented the awards.

THE Rising Sun Colliery Pit Consultative Committee has presented a watch to 17-year-old Michael Brady, a trainee miner, for presence of mind shown in a mining accident. Brady hurried for assistance when a colliery electrician was involved in an accident.

STANLEY COLLIERY, at Ilkeston (Derbyshire), closed last Friday, the working reserves of the 60-year-old pit having been exhausted. Three weeks ago the 230 men employed at the pit set up a new output per manshift record of nearly 60 cwt. Alternative jobs have been found for the miners.

VISITING THIS country in connection with the Soviet Trade Fair in London, a party of 20 Russian mining engineers inspected the underground workings at Easington Colliery, (Co. Durham), yesterday, (Thursday). Afterwards they toured the Acorn Bank open-cast coal site, Bedlington.

AT CARDIFF, the South-Western Divisional Coal Board received planning permission to build an eight-storey block of offices at its present office precinct site at Llanishen. Before giving approval, the city's public works and town planning committee considered objections by householders who claimed the scheme would detract from amenities.

DOUBLE TICKET for a weekend trip by air to Douglas, Isle of Man, is the prize to be won by 51 safety conscious employees of Durham Divisional Coal Board this month. The prizes are open to under-officials and workmen at divisional collieries and coking plants who were compensable accident free from April 3 to July 1, 1961. As well as the 51 main prizes, to be awarded by draw, there are 510 consolation awards of £1 premium bonds.

AT ITS MEETING last week Rotherham Rural Council expressed "bitter disappointment" at the poor public response to the appeal fund for dependants of the four men who died at Cortonwood Colliery, Wombwell, on June 19. To that date, not a penny had been subscribed at Wombwell. The only money received by the fund, launched by the rural council, was from the councillors themselves.

LAST PIT in the town, Northfield Colliery, Shotts (Lanarkshire) will close this week instead of in September as originally intended. After their holidays most of the 294 miners will be given employment at other collieries within travelling distance from their homes. About 40 men will remain at Northfield for a few months to salvage the plant. The pit is the ninth at Shotts to be closed since 1949.

AT THE ALFRETON (Derbyshire) inquest on Mr. John Prescott (56), a Wigan engineer, the jury recorded a verdict of Accidental Death. It was stated that Mr. Prescott, who had 40 years' experience of his job, rejected a safety precaution suggested to him while he was installing pithead winding gear at Alfreton Colliery. He was crushed by equipment which he had been earlier warned was out of position.

COAL BOARD has given notice that it intends to evict 106 families living in north-east Derbyshire, because the family wage earners no longer work in the pits. Commenting on the situation, an NCB spokesman said: "We are conducting a vigorous recruiting campaign and we need these houses. They are there to attract people into the mines." Chesterfield Rural Council is arranging exchanges between miners who live in council houses and non-miners who occupy houses owned by the Coal Board.

Miners Doubtful on Smokeless Fuel Allowances

TERMS of a draft agreement by the National Coal Board and the National Union of Mineworkers, which, if accepted, would mean that miners living in smoke-control areas would receive smokeless fuel to the value of £42 7s. a year in exchange for their concessionary coal, were the subject of meetings held last weekend.

Some union branches in the Barnsley Area argued that miners should receive the same amount of smokeless fuel as concessionary coal. At Dodworth Colliery no one who attended the meeting voted in favour of the agreement, while those at Wharncliffe Woodmoor, Nos. 1, 2 and 3 collieries, accepted the agreement "under protest," said branch secretary, Mr. Len Bowker. They stipulated, he added, that the agreement should be under constant review. The issue is to be discussed by the Yorkshire Area Council.

Safety in Mining Exhibition

SOME of today's main hazards in coal mining will be illustrated in an exhibition devoted to safety in mines research and application which will be staged at Nottingham University next week.

The exhibition is being organized by the Safety in Mines Research Establishment and is for members of the Institution of Mining Engineers, but it will also be open to the public. Models illustrating recent developments in safety techniques will be on show.

THE COAL TRADE

MERCHANTS are now faced, not so much with the problem of slackness in trading conditions, but with the difficulty of getting supplies of required grades and smokeless fuels. This situation is not general, but it certainly applies in a number of districts, particularly Yorkshire and Nottinghamshire. The main cause is the holiday season at collieries and manufactured fuel plants, but the problem so far as anthracite and Coalite are concerned is not likely to ease within the foreseeable future.

WEST MIDLANDS

Demand for house coal is more for stocking than consumption and orders are promptly met except where specially selected varieties from named collieries are nominated. A few of the collieries which produce well-known high-class house coals are well placed for orders, while the demand for large coal and cobbles, which stock well, is above average. Merchants have been more willing to take a high proportion of house nuts for stock building than in previous years. Apart from stock laid down in April when orders were scarce, collieries have not been compelled to stock house coal to any great extent and the total amount in stock at local collieries is not considerable. As outputs are a good deal less than a year ago, it is not expected that colliery ground stocks will grow very much in the next few months.

Merchants are better off in the way of depot stocks than they were a year ago and amounts are building up. Retail prices have changed little since May, but reductions are offered for sales of a ton and over. Best coals are selling at 9s. 2d. a cwt., medium quality descriptions, 7s. 1d., kitchen coal, 5s. 10d. Demand for manufactured fuels is small, but as merchants have little to spare from contract supplies, they are content to put surpluses to stock.

Merchants are fairly well booked up for Welsh fuels though they do not get all the supplies of anthracite nuts and beans which they can handle. This is sometimes due to a disinclination to accept poorer qualities. Anthracite grains are tight, while supplies of boiler nuts and Phurnacite are not easy to obtain. Coke remains a very quiet feature and the domestic user has not put much to stock. Stocks of coke have accumulated at merchants' depots up to about last year's level though at producers' works amounts are embarrassingly high.

Industrial demands are high, principally on account of re-stocking, but contractors are not experiencing any special difficulty in securing supplies. Beans and singles are not too plentiful, though steam-raising smalls are sufficient to meet demands. Stocks in hand at the larger industrial and institutional establishments are well up to consumers' programmes and winter stock levels will be reached before the space-heating season begins. Competition between road transport operators is keen and is often well below rail costs.

The hard coke market is very irregular. Blast-furnace qualities are well absorbed, but this is not the case in respect of general industrial coke. Orders for hard coke nuts are few and stocking at the ovens is considerable. Foundry coke sales continue at a good level though some buyers are not proposing to increase stocks. The popular makes from South Wales generally are fully absorbed.

AMERICAN ORDER for British dairy presses worth £200,000 has been placed with Fords (Finsbury), Limited, Kempston (Beds), a member of the Tube Investments, Limited, group.

Half-year Coal Sales Down

NOT all the drop of 1,302,000 tons in sales of coal in the home market for the first half of the year can be attributed to the competition from other fuels. It has been particularly noticeable since the beginning of January how the weather has affected coal sales. In the domestic market they were down by nearly 1,000,000 tons, the electricity industry was nearly 2,000,000 tons up, and there were decreases of varying degree in the other sectors. Exports and bunker sales were up by almost 100,000 tons.

Undistributed stocks continue to fluctuate around the 23,000,000-ton mark, but consumers' stocks have risen to almost 15,000,000 (13,650,000) tons.

There were 568,260 wage-earners on colliery books on July 1, against 598,710 on July 2, 1960, the numbers engaged at the coal face being 213,250 and 228,520 respectively. Total absenteeism (all workers) in the week ended July 1 was 15.67 per cent., compared with 14.53 per cent. in the week ended July 2, 1960. Output at the face was 4,131 tons and overall 1,412 tons in the week ended July 1, compared with 3,954 and 1,388 tons in the week ended July 2, 1960.

The following table gives (in tons) the provisional figures of output of saleable mined coal by division in the week ended July 8, and the tonnage lost through disputes:—

Division.	Week ended July 8, 1961.		Week ended July 9, 1960.
	Total output.	Tonnage lost.	Total output.
Scottish ..	288,000	74,000	292,000
Northern (N&C) ..	201,000	37,000	185,000
Durham ..	336,000	133,000	371,000
North-Eastern ..	748,000	88,000	755,000
North-Western ..	142,000	108,000	123,000
East Midlands ..	779,000	108,000	866,000
West Midlands ..	275,000	—	280,000
South-Western ..	258,000	120,000	283,000
South-Eastern ..	27,000	—	31,000
Great Britain—			
Deep-mined coal ..	3,054,000	668,000	3,186,000
Open-cast coal ..	172,000	—	158,000
Other deep-mined (including licensed mines) ..	41,000	—	39,000
TOTAL ..	3,267,000	668,000	3,383,000

H. J. BARLOW & COMPANY, LIMITED, manufacturers of bright drawn steel, bright bolts, nuts and washers, of Wednesbury (Staffs)—Second and final interim dividend 7½ per cent., makes 15 per cent. for 1960, as forecast when the shares were introduced in Birmingham last January. Consolidated profit amounted to £129,644 (£81,548) subject only to tax of £63,735 (£50,118).

Orders Placed

Coal Preparation Plant Contract

CONTRACT to design and erect a dense medium coal preparation plant at Bentley Colliery in the North-Eastern Division of the National Coal Board, has been received by Simon-Carves, Limited, Cheadle Heath, Stockport. The plant, which will provide additional large coal cleaning facilities at Bentley, will be capable of washing 250 tons per hour. The remainder will go either to the existing preparation plant or will be outloaded as a dry product.

Primary and secondary Drewboy dense medium separators, working in series, will comprise the new plant, together with all ancillary equipment. Site work is expected to start in approximately six months and it is estimated that the plant will be commissioned 18 months later.

FOR DELIVERY LATER this year, Matterson, Limited, Rochdale (Lancs), has received a £10,000 order from the Central Electricity Generating Board for the supply of three overhead cranes for the new power station at Richborough (Kent).

AUTOMATIC CONTROLLERS and integrating instruments are to be supplied by Honeywell Controls, Limited, Greenford (Middx), for the Rotherham (Yorks) works of Beatson, Clark & Company, Limited, which makes glass containers for all kinds of products.

AN ORDER FOR a coil pickling plant and acid recovery equipment, scheduled for operation towards the end of the year, has been received by John Thompson (Dudley), Limited, from Hungary. The pickling plant will handle about 17 tons of materials an hour.

CONTRACT WORTH £405,000, for the supply of continuous tray pusher furnaces, gas carburizing furnaces and sealed quench furnaces, has been received by AEI-Birlec, Erdington, from Czechoslovakia following recent visits to the country by Mr. J. H. Crossley, the firm's export sales director.

WORTH £110,000, contracts to supply about 50 Aquaspray wet-type dust collectors to Strojimport, Prague, Czechoslovakia, have been signed by the dust and fume control division of Tilghman's, Limited. The collectors will be operated in conjunction with foundry exhaust systems.

FIVE SETS OF marshalling equipment, worth £50,000, are being supplied by Brookhirst Igranic, Limited, a subsidiary of the Metal Industries, Limited, group, to Strachan & Hanshaw, Limited, for the new Spencer steelworks of Richard Thomas & Baldwins, Limited, at Llanwern, near Newport (Mon). They will control the automatic handling of railway wagons.

WITH A MAXIMUM unloading capacity of 2,000 tons per hour, a materials handling plant, worth about £125,000, has been ordered by William Hamilton & Company, Limited, shipbuilders, of Glasgow, from the General Electric Company, Limited. It will be installed in a self-unloading vessel which William Hamilton is building for North American owners.

ORDER FOR diesel engines worth £2,000,000 has been placed with the Perkins Group (a Massey-Ferguson Holdings, Limited, subsidiary) by Gebr. Claas Maschinenfabrik, the West German combine harvester manufacturers. The contract calls for the supply of four- and six-cylinder agricultural engines, and is claimed to be the biggest single order for diesels placed in Britain by a German company.

A CONSIDERABLE NUMBER of export orders, from at least 10 different countries ranging from Austria to Australia, has been received by Wild-Barfield Electric Furnaces, Limited, Watford (Herts). Among the interesting furnaces called for are vacuum induction and resistance heated equipments for Sweden and the International Atomic Energy Agency in Austria and a vertical pit type gas carburizing equipment for Finland.

A SUBSTANTIAL ORDER for machine-tool castings has been booked from India by Parkfield Foundries (Teesside), Limited, and although the value has not been disclosed it is understood that the work will constitute a considerable portion of the foundry's productive capacity for several months. The firm was formed earlier this year to take over the foundry business of Ashmore, Benson, Pease & Company, Limited.

FOLLOWING NEGOTIATIONS during, and subsequent to, the recent British Trade Fair in Moscow, BTR Industries, Limited, has been awarded a further major order for more than five miles of conveyor belting worth over £250,000. Deliveries will begin in September. The belting—some of which will be over 78 in. wide and of 14-ply construction, and up to 1½ in. thick—will be used for carrying iron-ore and non-ferrous metals.

CONTRACT worth £105,000 has been awarded to Associated Electrical Industries, Limited, by the British Transport Commission for renewing existing power feeders on five sections of Southern Region track in the Brighton and Sevenoaks areas. The traction division of AEI has received an order through AEI South Africa (Pty.), Limited, for three 2-ft. gauge, 28-ton, 500 v. underground locomotives for Goldfields of South Africa, Limited.

New RTB Tinplate Production Line Operating Soon

SECOND electrolytic tinning line at the Ebbw Vale plant of Richard Thomas & Baldwins, Limited, is to start running in tests this month. It is hoped to be in production in August. The line is capable of 6m. basis boxes of tinplate compared with the present line which was commissioned to produce 2.5m. basis boxes. A feature of the line will be that different weights of tin can be applied on either side of the material.

Among other special features are a strip printer to print a code identifying the lightly coated side of differential tinplate, and a production analyser which accumulates the footage of pinholes and faulty coatings, printing the record on a faulty card.

Research Development on AEI-Birlec Furnaces

INTENSITY and scope of development work being carried out at the new research department of AEI-Birlec, Limited, at Erdington, Birmingham, refutes the criticism that furnace-makers are not devoting enough resources to research, said Mr. P. F. Hancock, technical director.

With the department in full swing after its transfer from the firm's main factory in Birmingham, more than 20 separate investigations into problems in connection with the manufacture of furnaces are in progress at the laboratory, which is believed to be the best-equipped in the furnace industry and has a staff of about 30.

Company News

CONSETT'S RECORD OUTPUT

But Prospects "A Little Uncertain"

WHILE the trading year was a good one for the Consett Iron Company, Limited, for most of the period to April 1, 1961, demand for steel fell off in the last few months and prospects for the present year are "a little uncertain," says Viscount Ridley, chairman, in his report to shareholders. The new plate mill, by far the largest item in the present capital expenditure programme, is now working and in the last few months of the year proved itself capable of making a useful contribution to earnings.

Lord Ridley stresses, however, that there is still the need to conserve financial resources in view of the large expenditure which the new steel plant will need. Nevertheless the directors consider that a stage in the development programme has now been reached to justify increasing the dividend which, as previously reported, is 9½ per cent., compared with 8¾ per cent.

During 1960-61, the company produced a record of 966,000 ingot tons of steel, beating the previous record of 966,000 tons in 1956-57. More plates are expected to be sold this year, certainly for the next few months, and probably to the end of the financial year, but it is not expected that the new mill will be worked to capacity.

Revival in Demand

The chairman says that there seems to be a revival in the demand from consumer goods industries and motor manufacturers which should have an indirect effect on the sales of the company's other products, and there are some prospects of sales abroad, although at prices which are not very remunerative. Demand for the company's light re-rolled products from Jarrow is still good.

On the whole, says Lord Ridley, it looks as if the company will be working a little below maximum ingot capacity for the current year, but it will have the benefit of a reduction in the cost of rolling plates due to the new mill. "We shall be more competitive in sales of plates, since this mill can roll to a high standard of accuracy and includes a wide range of finishing processes."

As previously reported, the 1960-61 trading surplus, before depreciation, amounted to £5,008,659 against £3,906,625. This, says Lord Ridley, is a satisfactory increase which reflected the improvement in trading conditions and a gradual increase in the economy of operation of the plant.

Birmid Acquires Sterling Foundry

HOLDING company of manufacturers of alloys and castings, Birmid Industries, Limited, has agreed to purchase the capital of Sterling Foundry Specialities, Limited, of Bedford and Jarrow-on-Tyne, for £533,460 in cash. Completion took place on Monday, when the company became a wholly-owned subsidiary.

Sterling Foundry is a private company started in 1920 with American capital, and manufactures moulding boxes, flasks, and ancillary equipment largely for the foundry trade, and produces for sale and hire Safway scaffolding. Pneulec, Limited, already a group subsidiary, builds and instals foundry plant and machinery, and the two trades will be complementary.

The board of Birmid considers that substantial trading and financial benefits will accrue from the acquisition.

BIRFIELD, LIMITED—The trading results to April 30, 1961, compared with last year, were: Sales, £21,589,000 (£18,845,000); net trading surplus, £2,399,000 (£1,801,000).

BERRY'S ELECTRIC MAGICOAL, LIMITED, London, W.1—With net profit for the year ended March 31, 1961, increased to £257,340 (£213,978), effective total dividend is up to 33½ (22½) per cent.

RUSTON & HORNSBY, LIMITED, engineers, steel and ironfounders, of Lincoln—Net profit for the year to March 31, 1961, is £491,119 (£625,708). Despite the reduction, last year's dividend of 9 per cent. is being repeated.

FODENS, LIMITED, manufacturers of commercial vehicles, oil engines, etc., of Sandbach (Ches)—Total dividend for the year ended April 1, 1961, is being raised to 10 (7½ equivalent) per cent. Group net profit increased to £197,290 (£154,959), after tax of £196,813 (£130,937).

HAMMOND LANE FOUNDRY COMPANY, LIMITED, Dublin—Net profit for the year to March 31, 1961, was £41,618 (£38,246) after tax of £23,072 (£18,937) and a final dividend of 12½ per cent. makes a total of 17½ per cent. on increased capital of £28,437 (same on smaller capital of £22,750).

F. S. RATCLIFFE (ROCHDALE) LIMITED, manufacturers of flat and spiral springs—As forecast, dividend of 15 per cent. is being maintained for the year ended April 30, 1961, on capital increased by a one-for-four scrip issue. Group net profit is £35,792 (£36,409), after tax of £41,250 (£37,800).

COMBINED ELECTRICAL MANUFACTURERS, LIMITED, Holding company formed to effect the merger of Hackbridge & Hewittic Electric Company, Limited, and Switchgear & Cowans, Limited, announces a final dividend of 8½ per cent., making 12½ per cent. for its first period to March 31, 1961, as forecast.

BROWN & TAWSE, LIMITED, iron and steel metal merchants, stockholders, exporters and engineers, of Dundee—The company made a record trading profit

of £459,150 in the year to March 31, 1961, and the chairman, Mr. Miller H. Brown, looks forward to the current year's results "with tempered optimism."

UNITED SPRING COMPANY, LIMITED, Smethwick (Staffs)—Birmingham Industrial Trust is arranging a placing of 1,040,000 2s. ordinary shares in the company and application has been made to the Birmingham Stock Exchange for a quotation for the issued capital of £260,000, comprising 2,600,000 2s. ordinary shares.

CHARLES CHURCHILL & COMPANY, LIMITED, machinery and tool merchants, of Birmingham—The company has contracted to purchase the entire shareholding of Weatherley Oilgear, Limited, makers of machine tools and transmission equipment, of Biggleswade (Beds), which will continue with its present range of products.

SUTCLIFFE, SPEAKMAN & COMPANY, LIMITED, manufacturers of non-ferrous stampings and castings, brick and briquetting machinery, etc., of Leigh (Lancs)—With a final of 15 per cent., total dividend for the year to March 31, 1961, is being raised to 20 (17½) per cent. Group net profit increased to £92,273 (£79,742), after tax of £80,873 (£71,056).

PARMITER, HOPE & SUGDEN, LIMITED, manufacturing electrical engineers, of Manchester—Group profits recovered from £24,856 to £59,403 in the year ended March 31, 1961, and the dividend is restored to 20 (12½) per cent. with a final of 12½ per cent. After tax of £23,604 (£5,929), and depreciation charges, the net profit of £26,085 compares with £5,929.

HICK, HARGREAVES & COMPANY, LIMITED, engineers, ironfounders and millwrights, of Bolton (Lancs)—Following the 1 per cent. increase in the interim to 5 per cent., the final dividend at 15 per cent. is also raised by 1 per cent. making 20 (18) per cent. for the year ended March 31, 1961. Net profit is £397,503 (£397,903), after tax of £389,917 (£367,169).

JOHNSON, MATTHEY & COMPANY, LIMITED—Incoming orders for the first part of the current year to March 31, 1961, have, generally, been well maintained, reports the chairman, Mr. A. B. Coussmaker, and the outlook is "satisfactory." Expenditure of about £710,000 has been authorized for expansion of factory space and purchase of additional equipment at the Wembley and Harlow plants.

RICKETT, COCKERELL & COMPANY, LIMITED, coal, coke, and fuel oil merchants, of London, E.C.3—Dividend for the year ended March 31, 1961, is being raised from the equivalent of 1s. 4d. per 10s. ordinary share to 1s. 8d. per share. Not less than 1s. 4d. per share was forecast when the one-for-two scrip issue was made. Group net profit was £242,189 (£175,440) after tax of £253,076 (£168,514).

WARD & GOLDSTONE, LIMITED, manufacturers of electrical accessories, cables, wires, etc., of Salford (Lancs)—Net profit for the year ended March 31, 1961, is £513,056 (£495,457), after tax of £397,874 (£419,658). Final dividend of 12½ per cent. is recommended making an unchanged total of 17½ per cent. The chairman, Mr. Sampson Goldstone, says that once again the company's export figures were increased.

SHEFFIELD TWIST DRILL & STEEL COMPANY, LIMITED—Chairman and managing director, Mr. A. Dormer, reveals in his annual report for 1960 that the company's turnover was the highest ever, but the profit margins were not as good as in the past due to overall increase in costs. Net profit, before tax, was £698,139 (£517,078). The company has devoted much time to expanding its export trade, with the result that exports, which were a record, showed an increase of 47 per cent. over the previous year.

"Get Together" Urged in British Industry

CALL to both sides of industry to get together and make a complete reappraisal of their attitudes so that British industry could once again reach maximum efficiency was made by Viscount Amory, former Chancellor of the Exchequer, at the summer conference of the Industrial Co-partnership Association at Oxford. Referring to the increasing number of wage claims, he said: "We simply must not go on like this any longer. From a national point of view it is sheer suicide. At a time when we are failing to hold our share of international trade, our costs are being put up inexorably every day."

Lord Amory suggested the setting up of a standing joint body composed of employers and trade union representatives at national level with a joint permanent staff. It would be governed by industry itself "to develop positive co-operation and greater efficiency in industry to the benefit of all. The experience of managers and trade unionists working together as members of a joint staff would be invaluable and far-reaching," he said.

Perkins Plans Expansion of Diesel Engine Output

EXTENSIONS to its capacity at Peterborough and at a development area in the north-east of the country, which will add 50 per cent. to output by 1965-66, is planned by F. Perkins, Limited, group, one of the world's largest manufacturers of diesel engines. Turnover of the company this year is expected to exceed £30,000,000, compared with £26,000,000 last year and £18,000,000 in 1958.

Some 77 per cent. of output is being exported, either in customers' vehicles and products, or directly, the latter percentage being a record 50 per cent. The growing percentage of direct exports by Perkins (a Massey Ferguson Holdings, Limited, subsidiary), stems from a deliberate policy of seeking to provide standardized power units all over the world, mainly for road vehicles and tractors.

Rise in UK Exports of Electrical and Allied Goods

EXPORTS of electrical products and associated equipment in the first five months of this year are 8 per cent. up, compared with the same period of 1960, states the British Electrical and Allied Manufacturers' Association. The total value amounted to £138,000,000 compared with £127,900,000 last year. Exports of electrical and allied machinery remained about the same at £37,000,000, but cables and wires fell slightly to £10,000,000 for the period.

Sales to Australia, New Zealand, and South Africa showed substantial improvement, while exports to the Common Market countries rose by 50 per cent. Sales to both the US and Canada are down on last year.

Electrical imports into the UK are rising more slowly. The total of £28,900,000 for January-May, 1961, compares with £27,900,000, a rise of 4 per cent.

BECK & COMPANY (METERS), LIMITED—Mr. A. R. Wheatley and Mr. George Goodman Whiffen have retired from the board.

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Law Cases

Rope Not an "Obstruction": NCB Escapes Liability

AN appeal by the National Coal Board against a decision of Judge Ould in Rotherham County Court that it was liable under statute for an injury to a miner who fell over a steel rope underground in a Yorkshire colliery, has been allowed by the Court of Appeal. Mr. Leonard Cook, (55), a miner at Thurcroft Main Colliery, brough an action in the County Court on the grounds of negligence and breach of statutory duty under Section 34 (1) (B) of the Mines and Quarries Act, 1954, which provides that every road in a mine must be kept free from obstruction.

He was employed to keep a conveyor belt clear of rubble. The belt ran alongside a railed track used for trucks pulled by a steel rope running between the rails. In November, 1959, he saw a stone on the belt and went to remove it. As he stepped back he fell over the steel rope and was injured.

The County Court judge found that the NCB was not negligent in leaving the steel rope, but that a breach of Section 34 (1) (B) of the Act had been committed. The Appeal Court reversed the County Court judge's decision on the issue of liability under the statute.

Lord Evershed said the words of the Act were to be construed strictly, but the word "obstruction" was one of ordinary usage and must be applied to each particular set of circumstances. The court was not satisfied that the steel rope ought not to have been there. It was part of the railway mechanism and was not therefore an obstruction.

Lord Justices Harman and Donovan agreed. After the appeal had been allowed with costs, leave to appeal to the House of Lords was refused.

Workman Wins Dermatitis Appeal to Lords

GLASGOW workman who had claimed damages from the Motherwell Machinery & Scrap Company, Limited, Motherwell, alleging that he contracted dermatitis through the company's failure to provide adequate washing facilities, won his appeal to the House of Lords. Mr. Samuel Gardiner (46), acetylene burner, appealed against an interlocutor of the First Division recalling an interlocutor of Lord Kilbrandon who had awarded him £3,000 damages against the company.

Lord Reid said that while employed on the demolition of buildings and boilers in 1955, Mr. Gardiner was exposed to contact with oil, dust, and grease, and after three or four months contracted dermatitis. The Lord Ordinary held that it was industrial dermatitis and that the employers had been negligent in failing to provide adequate washing facilities. That decision was reversed by the Inner House on the ground that Gardiner had failed to prove any connection between his disease and the work he was doing.

Lord Reid said Gardiner had never suffered from dermatitis before, and his original symptoms were admittedly of industrial dermatitis. "In my opinion, when a man who has not previously suffered from a disease contracts that disease after being subjected to conditions likely to cause it, and when he shows that it starts in a way typical of disease caused by such conditions, he establishes a *prima facie* presumption that his disease was caused by those conditions. I think the facts proved in this case do establish such a presumption."

Lords Cohen, Hodson, and Guest agreed.

Scottish Opencast Executive Fined for River Pollution

FOR polluting part of the river Nith with coal dust, contrary to conditions agreed with the Solway River Purification Board, the National Coal Board Opencast Executive (Scottish Region) was fined £20 at Ayr Sheriff Court. The Opencast Executive pleaded Guilty to the offence, the first to be heard at Ayr Sheriff Court under the Rivers (Prevention of Pollution), Scotland Act, 1951.

Mr. R. G. Cruickshank, fiscal, said the coal dust came from open-cast workings at Burnston, near Cumnock. On March 25 a sample was taken from the river and found to contain a far greater amount of pollution by coal dust than the limits imposed by the purification board.

Mr. Hugh Hunter, for the executive, said that since the offence the executive's contractors at Burnston had spent a large sum of money on new methods and equipment to ensure pollution did not occur again.

CHAIRMAN'S WARNING

"I'VE been where there has been an explosion three times. Believe me, if you saw the results of an explosion you would never have carried matches into a mine." This comment was made by Mr. John Beaty, chairman of Blaydon Bench, and a former miner, in fining Thomas Briggs (36) £15 with £5 5s. costs, for carrying five cigarettes and six matches into Clockburn Drift Mine, Marley Hill (Co. Durham).

Briggs, who admitted the offence, has since lost his job.

CLAIM FOR £85 damages against the National Coal Board by Mr. John Neil (40), a packer, who sustained a knee injury at Glencraig Colliery, Glencraig (Fife), while removing steel supports, was dismissed at Dunfermline Sheriff's Court.

CLAIM FOR DAMAGES by Mr. Tegid Needham Jones, fitter's mate, against his employers, John Summers & Sons, Limited, Shotton (Ches), for an injury he received while carrying a sack of bolts, was dismissed with costs at Chester County Court.

FORMER TREASURER of the Dinnington Main (Sheffield) branch of the National Union of Mineworkers, Dennis Adams (39), has been sentenced to eight months' imprisonment on 13 charges of stealing from the union funds and to four charges of forgery. He pleaded Guilty and asked for six other forgery offences to be considered.

Appleby-Frodingham Appointments

LATEST appointments announced by the Appleby-Frodingham Steel Company, branch of the United Steel Companies, Limited, include: Mr. H. O. Frith, plant engineer, Frodingham steelworks; Mr. H. W. Pilkington, plant engineer, ore preparation plant; Mr. J. Crossman, plant electrical engineer (designate), rod and bar mill.

In the central engineering workshops, Mr. W. C. Hobson, assistant engineer foundries, will continue to be responsible for Ajax lance development, and Mr. Harold Stainton, formerly a turner, is to be apprentice instructor at the central engineering workshops.

*

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NEWS IN BRIEF

CRUDE STEEL output by Belgium in June totalled 645,000 tons compared with 644,000 tons in May and 617,000 tons in June, 1960. The comparative slackening in the rate of output rise was regarded as due to a change in production programmes.

THE LANCASHIRE FACTORIES of Leyland Motors, Limited, will be closed for the annual summer holidays from tonight (Friday) until Monday morning, July 31. An emergency service will be maintained by the company's Chorley service organization.

THE COAL BOARD loaned a boiler and other equipment and made its open-cast coal site at Pilsley (Derbyshire) available to allow the Nottingham engineering firm of Smith Brothers & Company (Hyson), Limited, to test a prototype steam hooter.

SALES OF David Brown Tractors (Eire), Limited, in the first five months of 1961, showed an increase over the equivalent figures for 1960. Notable increases were 50 per cent. in Europe, 43 per cent. in Australia and New Zealand, and 14 per cent. for the UK and Eire.

THE United Nations Economic Commission for Europe's Coal Committee has approved a proposal aimed at making the economic and social importance of coal in Europe more widely known and securing proper public appreciation of the European coal industries.

SAMPLE QUANTITIES of gallium arsenide intermetallic compound in polycrystalline form can now be offered by Johnson Matthey & Company, Limited. It is also hoped that single-crystal material will be available shortly. The material is available either as broken ingot or cut slices.

PRIVATE COMPANY, Methane Tanker Finance, Limited, has been registered with an initial capital of £100 to carry on the business of shipowners, etc. The Gas Council's scheme envisages two refrigerated tankers of about 11,000 tons capacity, capable of carrying 700,000 tons of liquid methane a year.

AFTER TALKS IN London last Friday between the shipbuilding employers and the engineering unions on measures to improve efficiency in the industry, one of the points agreed on concerned local stoppages and the need for early consultation between representatives of both sides at shipyard level. Another meeting will be held.

SUBJECT TO Japanese Government approval a joint Japan-German venture to supply iron and steelmaking equipment is to be founded in the near future. An agreement has been signed between the Demag Company of West Germany and Hitachi Shipbuilding & Engineering Company and Kinoshito Sansho, a commercial concern.

MINISTERIAL COUNCIL of the European Coal and Steel Community, meeting in Luxembourg, has granted Italy an extra quota of 15,000 metric tons for imports from non-ECSC countries of hot-rolled wide strip and at the special customs tariff of 3 per cent. Normal Italian duty is 9 per cent. The strip may be imported from the US.

LICENCE agreement has been signed by C. A. Parsons & Company, Limited, Newcastle-upon-Tyne, with Zallea Brothers, Delaware, USA, allowing the British company to manufacture and sell thinwall-bellows expansion joints of Zallea design. The joints are used to absorb movement in a wide range of piping applications, particularly in the oil and chemical industries.

FOUR long-serving employees of F. H. Lloyd & Company, Limited, steelfounders and engineers, of Wednesbury (Staffs), received presentations marking their retirement from chairman and managing director, Mr. F. N. Lloyd. They were Mr. R. S. Lavender, pattern inspector, Mr. J. A. Davis, maintenance foreman, Mr. G. B. Rowell, fettling foreman, and Mr. H. L. Parsons, foreman electrician.

INJURED IN AN explosion at the Ebbw Vale steelworks of Richard Thomas & Baldwins, Limited, on May 31, Mr. Howard Gibbs (27), steelworks helper, of Cwm (Mon), died in hospital on Thursday of last week. This brings the accident death roll to seven. A fund is being set up by Ebbw Vale Trades and Labour Council for the relief of the dependants of the seven men killed.

NEW 800-YD. airstrip of the United Steel Companies, Limited, at Coal Aston, near Sheffield, was "opened" last week when Mr. K. G. Lampson, managing director (sales), landed there in one of the group's two executive aircraft after a 55-minute flight from London. United Steel also has airstrips at Workington and Scunthorpe, so that all the company's main works are now accessible by air.

APPRENTICES REPRESENTING Newton Chambers & Company, Limited, in the Northern Counties Industrial Fire Brigades Competitions recently at Selby (Yorks), retained the trophy won last year by a team from the company. In the four-man dry hydrant drill, Newton Chambers No. 3 team produced a clean performance in 17.4 sec., which earned them second place and the trophy.

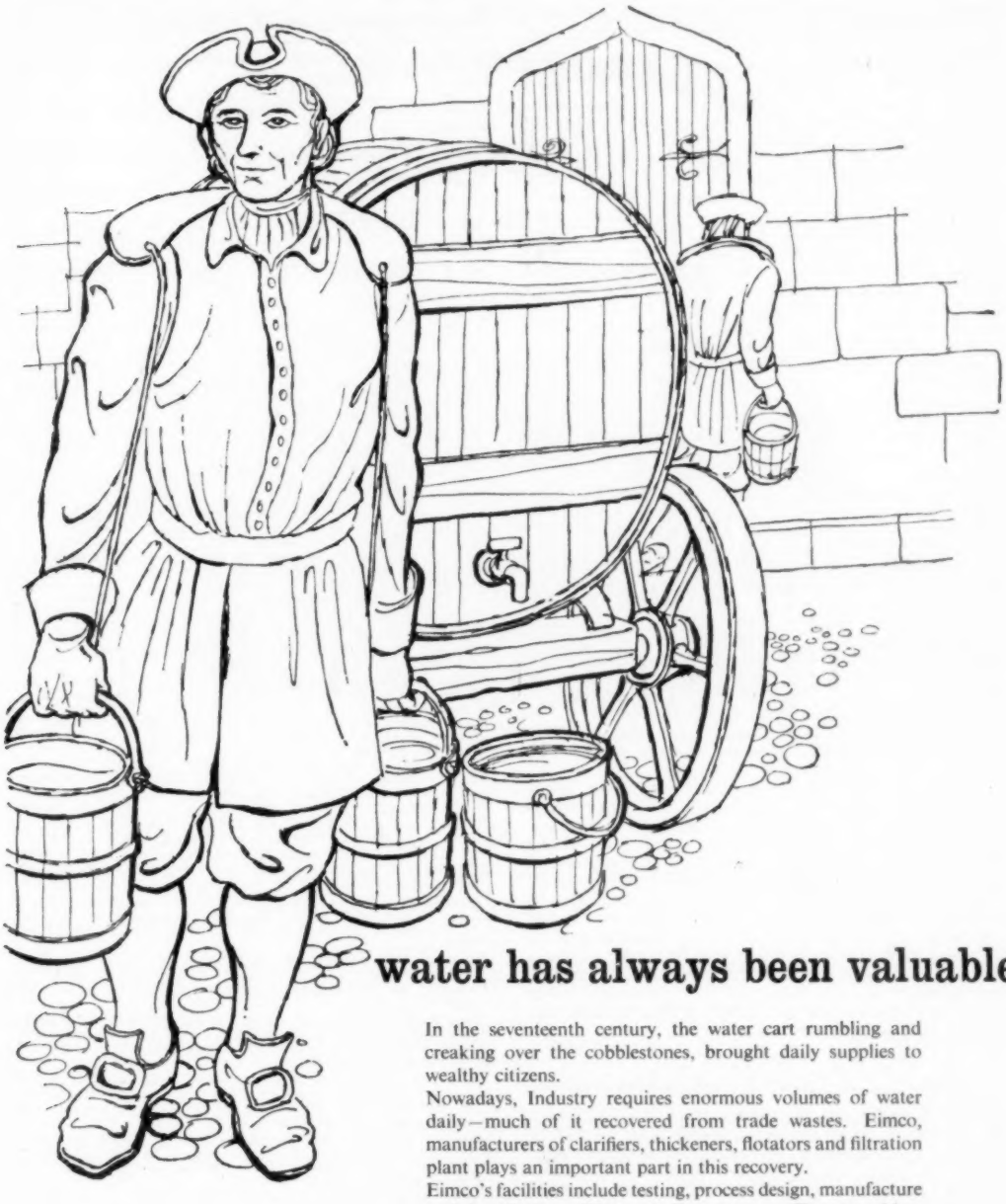
ARISING FROM the annual conference of the European Organization for Quality Control held last year in London, a national organization to co-ordinate and encourage the efforts of professional bodies in the field of quality control, in which the UK lags behind most European countries, is being formed. The fifth annual conference of EOQC is being held at Turin on September 11-13 on the theme of product quality.

NEW 16-TON Blackburn contour milling and die sinking machine has been installed at the Woodside works of the engineering division of British Oxygen Company, Limited. The tracer-controlled machine is believed to be first of its kind to go into production and will be used, among other things, for the reproduction of all-metal aircraft models for wind tunnel testing at the Royal Aircraft Establishment.

DEVELOPMENT of a Vee-form version of its "F" series of diesels is announced by the National Gas & Oil Engine Company, Limited. This will extend the range of National "F" engines, already available from 285 to 1,550 b.h.p., to 3,100 b.h.p. in 16-cylinder form, making this what is claimed to be one of the most powerful engines in the world for continuous industrial operation at 600 r.p.m.

STRUCTURAL and heavy precision engineers, Sheppard & Sons, Limited, of Bridgend (Glam), recently finished making its largest ingot casting machine. Thirty-five ft. high and weighing 150 tons, the machine was shipped from Swansea Docks on Monday to Finland where it will be used for the production of ingots in a new pig-iron smelting plant. The order was from the Finnish company, Oy Koverthar.

AT THE ANNUAL meeting of the Groupement de l'Industrie Sidérurgique, the president, Mr. Jacques Ferry, said that from the three points of view of production, investment and financial results, 1960 marked new and noteworthy progress for the group of French steelmaking companies. The rate of ex-



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P3547

pansion of investment, increased by 24.3 per cent., was the biggest in the whole period of the third steel plan.

TEAM OF APPRENTICES representing the UK which recently flew to Germany as guests of the West German Government to compete against young craftsmen of other European countries, included 17-year-old Ronald Taylor, an apprentice moulder at the Thorncliffe works of Newton Chambers & Company, Limited, Sheffield, and John E. Frost, aged 18, of the standard products department at the company's Waterside works.

CHAIRMAN OF THE Gas Council, Sir Henry Jones, announced in London on Wednesday that the industry had made a financial surplus during the year ended March 31, 1961. He said that although the weather had been warmer than usual, sales of gas during the period increased by about 2¼ per cent. and were thus at a record level. "A useful, though modest, surplus was earned by the industry as a whole," Sir Henry added.

TO CONCENTRATE in one place the activities of Simon Engineering, Limited, in coal preparation and mining work, the coal preparation and mining division of Simon-Carves, Limited, is being transferred to Carlisle. After December 31, 1961, its address will be:—Simon-Carves, Limited, PO Box No. 26, Durranhill, Carlisle. The Automatic Coal Cleaning Company, Limited, Carlisle, already operates from the Carlisle address.

FOLLOWING AN agreement between English Electric Company, Limited, and Rolls-Royce, Limited, the aero engine business of D. Napier & Son, Limited, a subsidiary of English Electric will be carried on by a new company, Napier Aero Engines, Limited, owned equally by Napier and Rolls-Royce. The London factories of D. Napier & Son, which are principally engaged on aero engine work, will be operated by the new company. All activities of D. Napier & Son in factories and establishments at Luton, Liverpool and Netherton are not affected by the new arrangement.

FOLLOWING THE DEATH early this year of Mr. Willie Hobson, who before his retirement in 1960 after nearly 50 years' service with the Falkirk Iron Company, Limited, had been organizer for 39 years of the Allied Ironfounders' annual golf outing, 68 competitors in the annual competition contributed towards a silver cup which they named the Willie Hobson Trophy. In memory of his many unsuccessful attempts to win a prize at the annual meetings, it is awarded for the best performance by anyone who has never won a prize in an Allied Ironfounders' competition. It was won recently for the first time by 15-year-old office boy Colin Grant, youngest employee ever to take part in the competition.

George Cohen Profits Down

GROUP profits of the George Cohen 600 Group, Limited, engineers, iron, metal and machinery merchants, of London, W.12, for the year ended March 31, 1961, fell by 12½ per cent., but the company is repeating the 13 per cent. total dividend as forecast when the two-for-five rights issue was made in November. The final dividend of 8½ per cent. is on £4,375,000 ordinary shares. Interim and last year's dividends were on £3,125,000.

Net profit is £644,808 (£785,071), after tax of £755,907 (£788,244). Although the machine tool interests of the group have probably had a satisfactory year, increased costs and competitive pressure, especially oversea, will have had the familiar effect on margins.

Increases of Capital

SIGMUND PUMPS, LIMITED, Gateshead, increased by £100,000 in £1 ordinary shares, beyond the registered capital of £160,000.

BYNEA STEEL WORKS, LIMITED, Llanelly, increased by £100,000 in £1 ordinary shares, beyond the registered capital of £638,025.

HAWKESBURY GAUGE & TOOL, LIMITED, Coventry, increased by £1,000 in £1 ordinary shares, beyond the registered capital of £1,000.

LOEWY ENGINEERING COMPANY, LIMITED, Bournemouth, increased by £100 in £1 shares, beyond the registered capital of £200,000.

RANGE BOILERS, LIMITED, Stalybridge (Ches), increased by £240,000 in 5s. ordinary shares, beyond the registered capital of £300,000.

POLLARD BEARINGS, LIMITED, London, W.1, increased by £240,000 in £1 ordinary shares, beyond the registered capital of £260,000.

METAL BOX COMPANY, LIMITED, London, W.1, increased by £5,000,000 in £1 ordinary shares, beyond the registered capital of £25,000,000.

BRIDGE FOUNDRY COMPANY, LIMITED, Wednesbury, increased by £90,000 in £1 ordinary shares, beyond the registered capital of £110,000.

C. R. DENTON STEEL & TOOL COMPANY, LIMITED, Sheffield, increased by £48,000 in £1 ordinary shares, beyond the registered capital of £2,000.

NEWALL ENGINEERING COMPANY, LIMITED, Peterborough, increased by £50,000 in 2s. ordinary shares, beyond the registered capital of £500,000.

HENRY SIMON (HOLDINGS), LIMITED, engineers, etc., of Stockport, increased by £1,999,900 in £1 ordinary shares, beyond the registered capital of £100.

POLLARD BEARINGS (NORTHAMPTON), LIMITED, London, W.1, increased by £180,000 in £1 ordinary shares, beyond the registered capital of £70,000.

SANDERSON & SONS (NUNEATON), LIMITED, ironfounders, etc., Nuneaton, increased by £6,000 in £1 ordinary shares, beyond the registered capital of £6,000.

H. W. LINDOP & SONS, LIMITED, malleable ironfounders, etc., of Walsall, increased by £50,000 in 1s. ordinary shares, beyond the registered capital of £100,000.

TIPPER INDUSTRIES, LIMITED, ironfounders, etc., of Birmingham, increased by £250,000 in 5s. ordinary shares, beyond the registered capital of £150,000.

AVERYS, LIMITED, weighing machine manufacturers, etc., of Birmingham, increased by £2,000,000 in £1 ordinary shares, beyond the registered capital of £5,000,000.

N. GREENING & SONS, LIMITED, mine manufacturers, etc., of Warrington (Lancs), increased by £1,000,000 in 5s. ordinary shares, beyond the registered capital of £1,600,000.

GRIFFIN & GEORGE, LIMITED, scientific instrument makers, etc., of Wembley (Middx), increased by £300,000 in £1 ordinary shares, beyond the registered capital of £700,000.

SIDNEY RAINES, LIMITED, iron and steel merchants, stockholders, etc., of Wakefield (Yorks), increased by £20,000 in £1 ordinary shares, beyond the registered capital of £30,000.

W. H. ALLEN SONS & COMPANY, LIMITED, mechanical and electrical engineers, etc., of Bedford, increased by £1,000,000 in £1 ordinary shares, beyond the registered capital of £2,250,000.

WILBRAHAM & SMITH, LIMITED, metal and engineers' agents and merchants, etc., of London, E.C.2, increased by £150,000 in £1 ordinary shares, beyond the registered capital of £50,000.

REAVELL & COMPANY, LIMITED, makers of compressors and exhausters for air and gases, etc., of Ipswich, increased by £300,000 in £1 ordinary shares, beyond the registered capital of £200,000.

THOMAS, THOMAS & BAINBRIDGE, LIMITED (formerly A. Bainbridge, Limited), iron and steel merchants, etc., of Thornaby-on-Tees, increased by £95,000 in £1 ordinary shares, beyond the registered capital of £5,000.

GLACIER METAL COMPANY, LIMITED, Wembley (Middx), increased by £500,000 in 250,000 6½ per cent. cumulative preference shares of £1 and 1,000,000 ordinary shares of 5s. each, beyond the registered capital of £1,250,000.

LANSING BAGNALL, LIMITED, engineers, and truck manufacturers, etc., of London, S.W.1, increased by £500,000 in £1 7½ per cent. redeemable cumulative preference shares, beyond the registered capital of £363,000.

SIMON ENGINEERING, LIMITED (formerly Henry Simon (Holdings, Limited), Stockport, increased by £2,000,000 in 2,710,730 ordinary and 5,289,270 unclassified shares of 5s. each, beyond the registered capital of £4,000,000.

T. B. PEARSON & SONS (ENGINEERS), LIMITED, Walker, Newcastle-upon-Tyne, increased by £140,000 in 50,000 ordinary, 45,000 preferred ordinary, and 45,000 redeemable preference shares of £1 each, beyond the registered capital of £60,000.

CAMBRIDGE INSTRUMENT COMPANY, LIMITED, mechanical and electrical engineers, manufacturers of scientific instruments, etc., of London, S.W.1, increased by £150,000 in 5s. ordinary shares, beyond the registered capital of £1,500,000.

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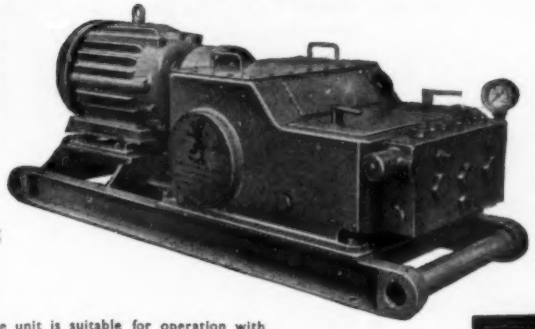

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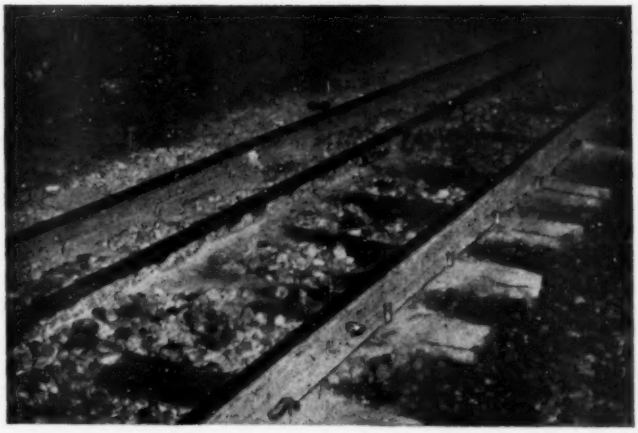

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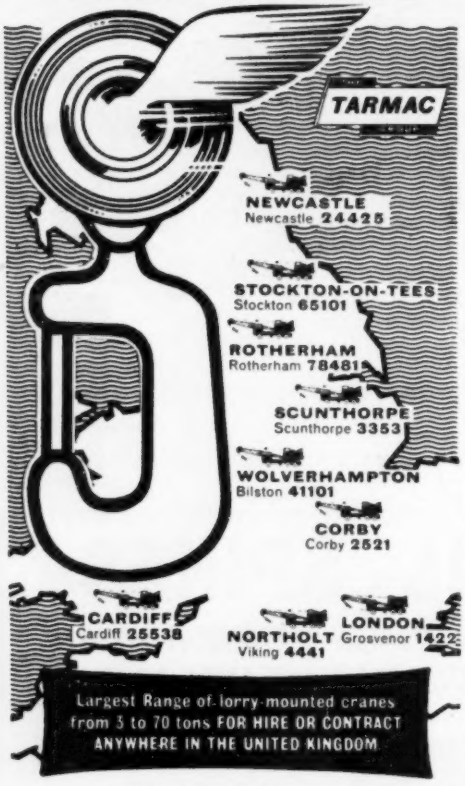

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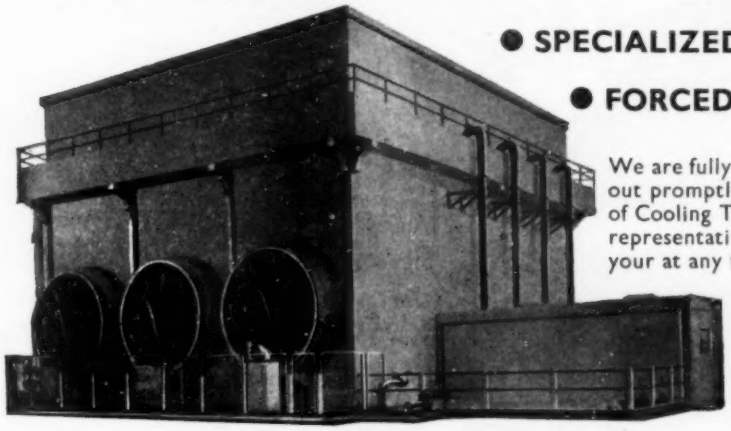

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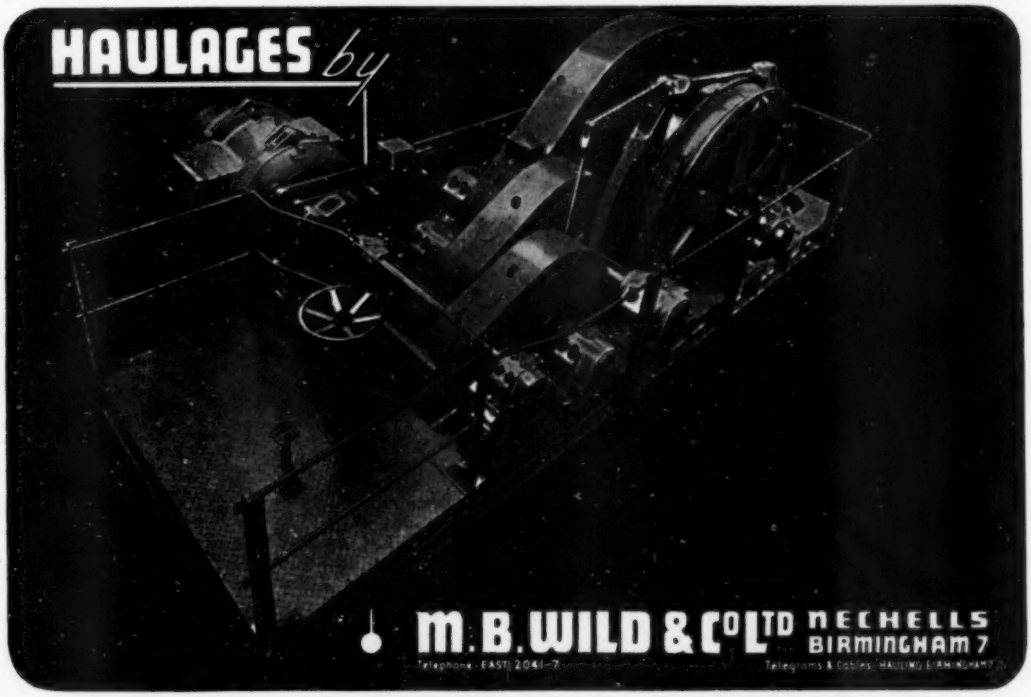

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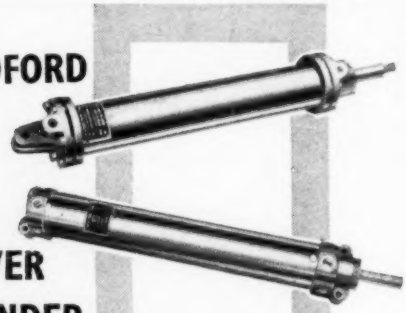

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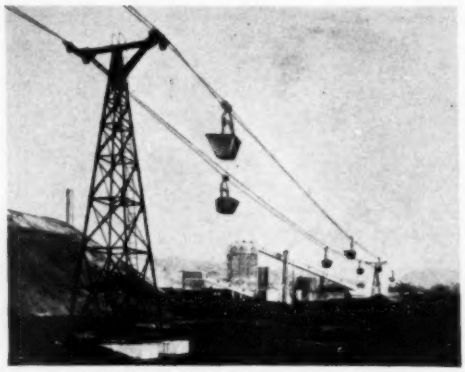

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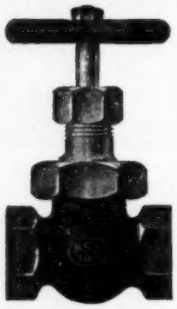

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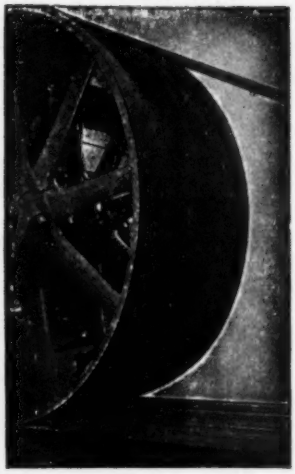

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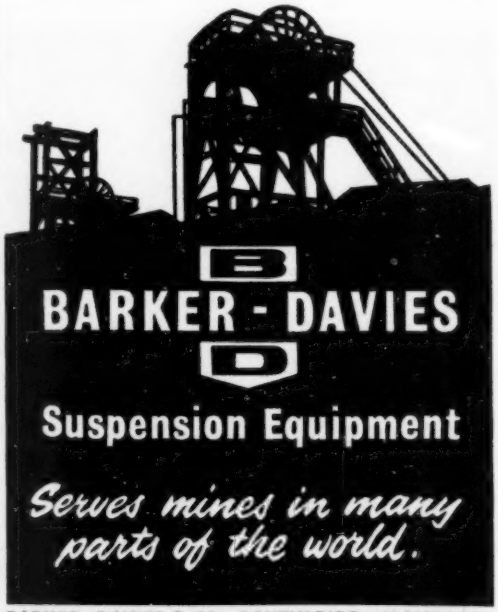

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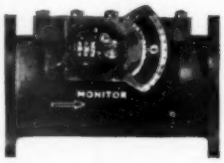

Fig. 1.

Fig. 2.

Fig 3.

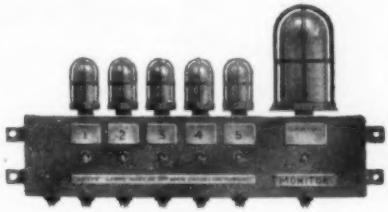

Fig. 4.

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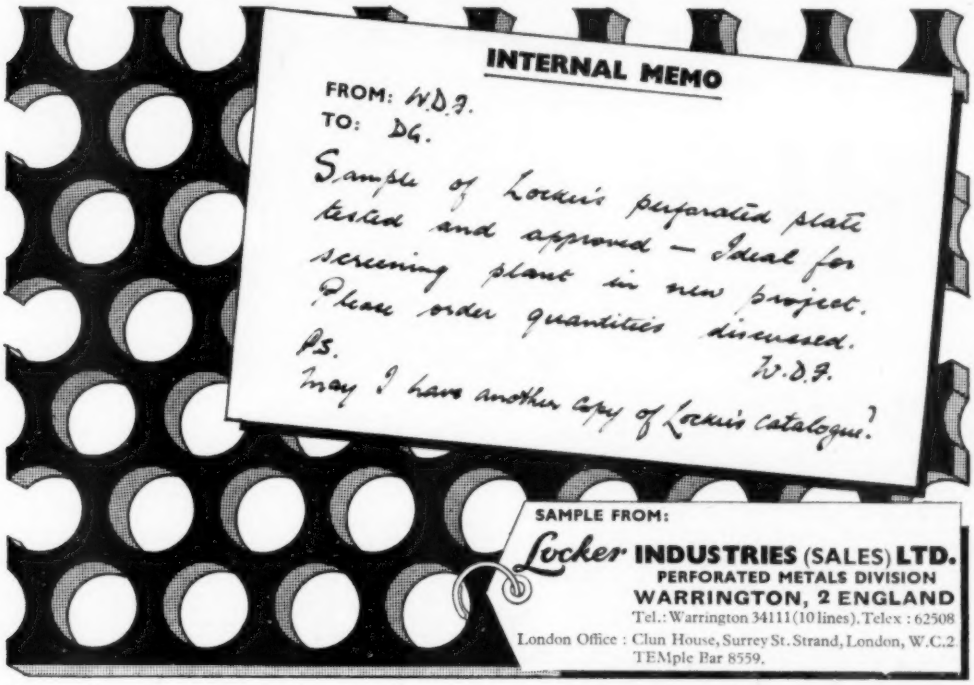
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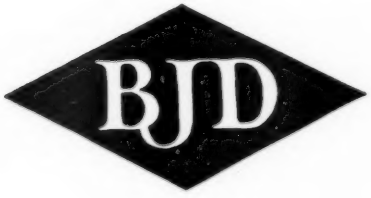

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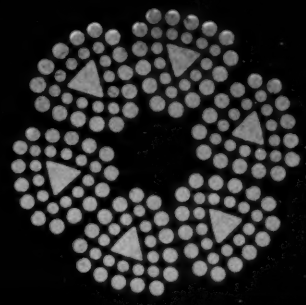

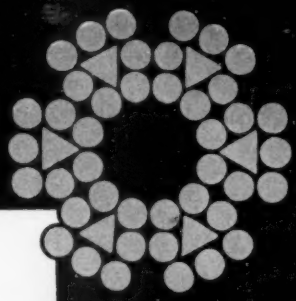

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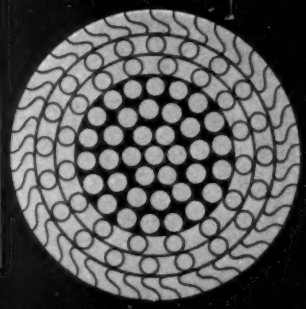

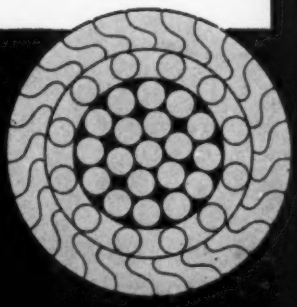

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